THE JOURNAL OF

MEDICAL EDUCATION

OFFICIAL PUBLICATION OF
THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

JUNE 1956 • VOLUME 31 • NUMBER 6

Table of Contents

VOL. 31 JUNE 1956 No. 6

ARTICLES

The Journal of
MEDICAL EDUCATION

Official publication of the Association of American Medical Colleges, 185 N. Wabash Ave., Chicago 1.

The Journal of MEDICAL EDUCATION is owned and published monthly by the Association of American Medical Colleges, 185 N. Wabash Ave., Chicago 1; Phone, STate 2-8870. Entered as second class matter January 17, 1930, at the Post Office, Chicago, Ill., under the Act of March 3, 1879.

EDITORIAL BOARD: John Z. Bowers, chairman, Wisconsin; Stanley E. Bradley, Columbia; T. Hale Ham, Western Reserve; Julius H. Comroe Jr., Pennsylvania; Russell L. Holman, Louisiana State; Erwin A. Ackerknecht, Wisconsin (consultant); Dean F. Smiley, secretary.

STAFF: Editor, Dean F. Smiley; Assistant Editor, Barbara M. Peterson; Editorial Assistant, Lucile Smith.

CORRESPONDENTS: Sidney C. Truelove, England; Prem Wahi, India; Yoshio Kusama, Japan.

EDITORIAL POLICY: Articles ordinarily will be limited to 5,000 words in length. Articles longer than this usually will require treatment as a supplement and necessitate a publication subsidy. Responsibility for signed articles and editorials is not assumed by the Association's officers or the Journal's Editorial Board but by the individual author.

SUBSCRIPTION RATES: $7 per year, $1 per single copy; foreign $8 per year; $1.25 per single copy. Change of Address: Notifications of changes of address should include the old address wrapper and the new address.

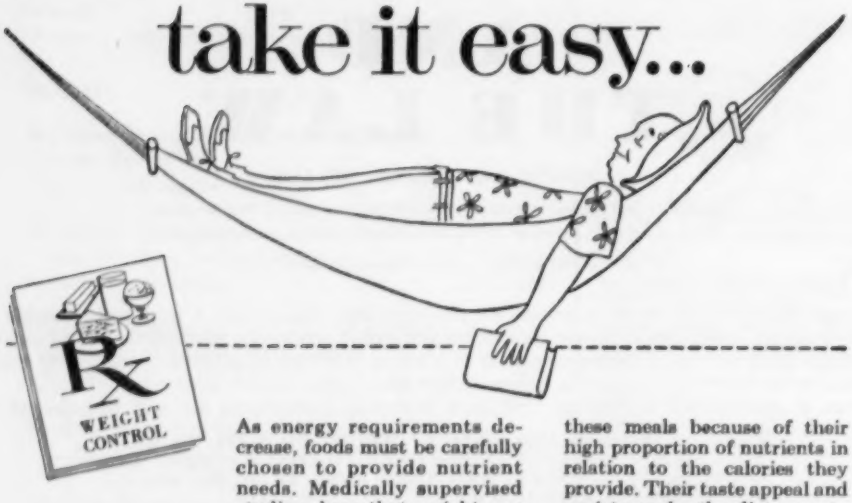
COPY DEADLINE: Copy for typesetting must be in by the 1st and plates by the 10th of the month preceding publication.

ADVERTISING: Journal of Medical Education, 185 N. Wabash Ave., Chicago 1, Ill.; STate 2-8870.

REPRINTS: Each author routinely receives 25 copies of his article promptly after publication. Additional reprints may be purchased from the Journal in quantities of 100, and in multiples of hundreds at a price depending on the length of the article.

Printed in U.S.A.

when it's time to take it easy...



As energy requirements decrease, foods must be carefully chosen to provide nutrient needs. Medically supervised studies show that weight can be lost and desired weight maintained on a palatable diet of familiar and well-liked foods. This diet supplies generous quantities of high quality protein and calcium . . . nutrients frequently low in the food intake of older people.

The necessary foods for the diet can readily be chosen from the family table by the older person who lives with a younger family—are easily prepared by the person who cooks small meals.

The foods included in these diets provide all essential nutrients in amounts recommended for adults. Only calories are in deficit. Dairy foods are an important feature of these meals because of their high proportion of nutrients in relation to the calories they provide. Their taste appeal and variety make the diet easy to follow until the desired weight is lost.

Doctors! Send for the convenient leaflet and diet instruction sheets containing menus for three full meals a day for an entire week. Diets at two moderately low calorie levels are included. These diet instructions will be useful even where a person may require a different calorie level for weight loss. For such individuals, the physician can suggest desired modification, retaining the basic diet plan.

These materials are yours on request—without cost or obligation. Simply clip the coupon below, fill it in and mail it today.

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

NATIONAL DAIRY COUNCIL—*A non-profit organization* T-5
Since 1915 . . . promoting better health through nutrition research and education.
111 N. Canal Street, Chicago 6, Illinois.
Please send me, without cost or obligation, a pad of diet instruction sheets and leaflet on weight reduction.

NAME _____

PROFESSIONAL DESIGNATION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Association of American Medical Colleges

OFFICERS OF THE ASSOCIATION 1955-56

Officers and Members of Executive Council

President and Chairman of Council: ROBERT A. MOORE.....Pittsburgh
President-Elect: JOHN B. YOUMANS .....Vanderbilt
Vice-President: HAROLD S. DIEHL.....Minnesota
Treasurer: STOCKTON KIMBALL.....Buffalo
Immediate Past President: VERNON W. LIPPARD .....Yale
Secretary: DEAN F. SMILEY .....AAMC
GEORGE N. AAGAARD.....Washington (Seattle)
WALTER R. BERRYHILL.....North Carolina
LOWELL T. COGGESHALL.....U. of Chicago
THOMAS H. HUNTER.....U. of Virginia
JOHN Z. BOWERS.....Wisconsin
JOHN F. SHEEHAN.....Stritch (Loyola)

Staff

DEAN F. SMILEY, Secretary; Editor, *Medical Education*
J. EDWIN FOSTER, Director, Medical Audio-Visual Institute
HELEN H. GEE, Director of Research
WILLIAM N. HUBBARD JR., Associate Secretary

Committees of the Association 1955-56

(Chairmen listed first—Affiliation listed in italics)

AUDIOVISUAL EDUCATION

Walter A. Bloedorn, *Geo. Washington*
A. J. Gill, *Southwestern*
Roscoe L. Pullen, *Missouri*
William W. Frye, *Louisiana*
W. Clarke Wescoe, *Kansas*
William J. Darby, *Vanderbilt*
Clarence E. de la Chapelle, *NYU, P.G.*
Tom Jones, Consultant, *Illinois Emeritus*

BORDEN AWARD

Joseph Markee, *Duke*
Arnold Rich, *Johns Hopkins*
Elmer H. Stotz, *Rochester*
Windsor C. Cutting, *Stanford*
Oliver Lowry, *Washington U.*

CONTINUATION EDUCATION

Samuel Proger, *Tufts*
James W. Colbert, *St. Louis*
Theodore H. Harwood, *North Dakota*
Robert Howard, *Minnesota*
Frank Roberts, *Tennessee*
Daniel T. Rolfe, *Meharry*
Thomas Sternberg, *UCLA*
Grant Taylor, *U. of Texas, P.G.*
Milton Terris, *Buffalo*

EDITORIAL BOARD

John Z. Bowers, *Wisconsin*
Stanley E. Bradley, *Columbia*
T. Hale Ham, *Western Reserve*
Julius H. Comroe, *Pennsylvania* (Grad)
Russell L. Holman, *Louisiana*
Erwin H. Ackerknecht, Consultant, *Wisconsin*
Dean F. Smiley, *AAMC*

FINANCING MEDICAL EDUCATION

Joseph C. Hinsey, *New York Hosp.—Cornell*
Walter A. Bloedorn, *Geo. Washington*
Donald G. Anderson, *Rochester*
Stanley E. Dorst, *Cincinnati*
Vernon W. Lippard, *Yale*
Norman Topping, *Pennsylvania*
John B. Youmans, *Vanderbilt*

INTERNATIONAL RELATIONS IN MEDICAL EDUCATION

Richard H. Young, *Northwestern*
M. E. Lapham, *Tulane*
E. Grey Dimond, *Kansas*
Walter E. Macpherson, *C.M.E.*
Norman B. Nelson, *Iowa*
Jean A. Curran, *SUNY.*
R. Hugh Wood, *Emory*
Francis Scott Smyth, *U. of Cal. (S.F.)*
Elizabeth T. Lam, Consultant, *Comm. on Internatl. Exch. of Persons*
Harold H. Loucks, Consultant, *China Medical Board of New York, Inc.*
Myron Wegman, Consultant, *Pan American Sanitary Bureau*

INTERNSHIPS, RESIDENCIES AND GRADUATE MEDICAL EDUCATION

E. Hugh Luckey, *Cornell*
John Deitrick, *Jefferson*
Howard Armstrong, *Illinois*
D. W. E. Baird, *Oregon*
F. Douglas Lawrason, *Arkansas*
Richard W. Vilter, *Cincinnati*
George A. Wolf Jr., *Vermont*
Francis R. Manlove, *Colorado*
R. D. Pruitt, *Mayo Foundation*

LICENSURE PROBLEMS

J. Murray Kinsman, *Louisville*
John Hirschboeck, *Marquette*
Gordon E. Goodhart, *U. of S. Cal.*
Arthur W. Wright, *Albany*
Wayne L. Whitaker, *Michigan*
James E. McCormack, *Columbia*

MEDICAL CARE PLANS

John F. Sheehan, *Loyola*
Frank R. Bradley, *Washington U.*
R. H. Kampmeier, *Vanderbilt*
Henry B. Mulholland, *Virginia*
Albert Snoke, *Yale*

PLANNING FOR NATIONAL EMERGENCY

Stanley W. Olson, *Baylor*
Mark R. Everett, *Oklahoma*
Thomas R. Forbes, *Yale*
Stockton Kimball, *Buffalo*
John B. Truslow, *Med. Coll. of Virginia*

(*Committees continued on page VI*)

(Committees continued from page V)

PROGRAM

Robert A. Moore, *Pittsburgh*
John B. Youmans, *Vanderbilt*
Harold S. Diehl, *Minnesota*
Dean F. Smiley, *Secretary*

PUBLIC INFORMATION

John L. Caughey, *Western Reserve*
Francis M. Forster, *Georgetown*
John D. Van Nuys, *Indiana*
Harold C. Wiggers, *Albany*
Joseph B. Kelly, Consultant, *Johns Hopkins*
Milton Murray, Consultant, *Medical Evangelists*
Ralph Rohweder, Consultant, *Nat'l. Soc. for Med. Research*
Raymond O. Torr, Consultant, *Nat'l Fund for Med. Educ.*

EDUCATIONAL RESEARCH AND SERVICES

George Packer Berry, *Harvard*
D. Bailey Calvin, *Texas*
Stanley E. Dorst, *Cincinnati*
Thomas Hunter, *U. of Virginia*
Carlyle Jacobsen, *SUNY.*
Vernon W. Lippard, *Yale*
W. Clarke Wescoe, *Kansas*
William R. Willard, *SUNY, Syracuse*
Robert A. Moore, *Pittsburgh, ex officio*
Helen H. Gee, *Secretary*

SUBCOMMITTEE ON EVALUATION AND MEASUREMENT

Thomas Hunter, *U. of Virginia*
John T. Cowles, *Pittsburgh*, vice chairman
George Packer Berry, *Harvard*
Carlyle Jacobsen, *SUNY.*
William Schofield, *Minnesota*
Helen H. Gee, *AAMC*

VETERANS ADMINISTRATION MEDICAL SCHOOL RELATIONSHIPS

Joseph Hayman, *Tufts*
George A. Bennett, *Jefferson*
Robert C. Berson, *Alabama*
Gordon H. Scott, *Wayne*
Harold Hinman, *Puerto Rico*

Representatives to Related Organizations

ADVISORY BOARD FOR MEDICAL SPECIALTIES

Stanley E. Dorst, *Cincinnati*
John B. Youmans, *Vanderbilt*

ADVISORY COUNCIL FOR THE NATIONAL FUND FOR MEDICAL EDUCATION

Joseph C. Hinsey, *New York Hosp.—Cornell*
John B. Youmans, *Vanderbilt*
Vernon W. Lippard, *Yale*

ADVISORY COUNCIL ON MEDICAL EDUCATION

Robert A. Moore, *Pittsburgh*
John B. Youmans, *Vanderbilt*

AMERICAN COUNCIL ON EDUCATION

Marion Fay, *Women's Medical Coll.*
William Stone, *Maryland*
Edward J. Van Liere, *W. Va.*
John T. Cuttino, *Med. Coll. of S.C.*
George A. Bennett, *Jefferson*
Robert S. Jason, *Howard*

FEDERATION OF STATE MEDICAL BOARDS

J. Murray Kinsman, *Louisville*

FELLOWSHIPS SELECTION BOARD (WHO)

Walter A. Bloedorn, *George Washington*

NATIONAL INTERN MATCHING PROGRAM, INC.

E. Hugh Luckey, *Cornell*
George A. Wolf Jr., *Vermont*
Lowell T. Coggeshall, *U. of Chicago*

JOINT COMMITTEE ON MEDICAL EDUCATION IN TIME OF NATIONAL EMERGENCY

Stockton Kimball, *Buffalo*
Mark R. Everett, *Oklahoma*
Stanley W. Olson, *Baylor*
Dean F. Smiley, *AAMC*

LIAISON COMMITTEE WITH COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

Vernon W. Lippard, *Yale*
Robert A. Moore, *Pittsburgh*
John B. Youmans, *Vanderbilt*
Harold S. Diehl, *Minnesota*
Dean F. Smiley, *AAMC*

MEDICAL ADVISORY COMMITTEE ON INSTITUTE OF INTERNATIONAL EDUCATION

Duncan W. Clark, *SUNY, (Brooklyn)*
Lawrence Hanlon, *Cornell*
Ralph E. Snyder, *N.Y. Med. Coll.*

NATIONAL BOARD OF MEDICAL EXAMINERS

John Deitrick, *Jefferson*
Robert A. Moore, *Pittsburgh*
B. O. Raulston, *Southern California, Emeritus*

NATIONAL HEALTH COUNCIL

Jean A. Curran, *SUNY. (Brooklyn)*
Aura Severinghaus, *Columbia*
John McK. Mitchell, *Pennsylvania*

SUBCOMMITTEE ON MEDICAL EDUCATION FOR NATIONAL DEFENSE

Stanley W. Olson, *Baylor*
George V. Byfield, *Illinois*
Lawrence Hanlon, *Cornell*
Stockton Kimball, *Buffalo*
John B. Youmans, *Vanderbilt*
John Truslow, *Med. Coll. of Va.*
William C. Moloney, *Tufts*

COOPERATING COMMITTEE ON GRADUATES OF FOREIGN MEDICAL SCHOOLS

John McK. Mitchell, *Pennsylvania*
J. Murray Kinsman, *Louisville*
Wayne L. Whitaker, *Michigan*

MEMBER OF INTERNSHIP REVIEW BOARD OF COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

John Deitrick, *Jefferson*

For antibacterial protection without retarding healing

Since it's always "open season" on abrasions and lacerations when children play, FURACIN Soluble Dressing fulfills a unique role in preventing or controlling wound infections and permitting undisturbed healing. For routine first aid management of skin lesions in the office—or on home calls—it is unexcelled.

- bactericidal to the majority of pathogens found in surface infections*
- does not retard epithelization; granulation*
- cannot sensitize the patient to systemic antibiotic therapy
- water-miscible base mixes freely with wound exudates to reach infected areas without tissue maceration

For topical antibacterial therapy in: abrasions, lacerations • surgery • severe burns • skin grafting • ulcers • pyodermas

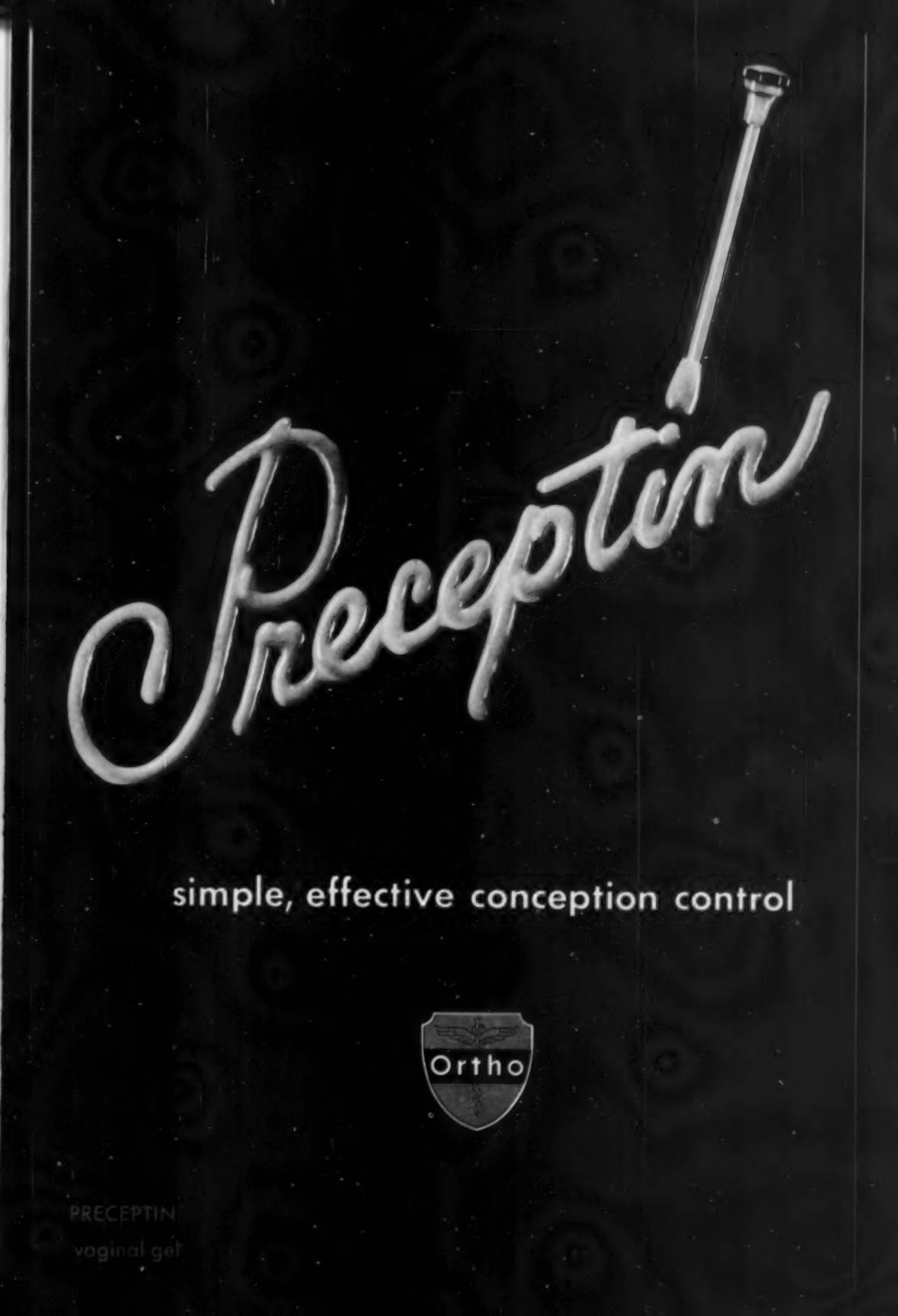
FURACIN Soluble Dressing, Solution and Soluble Powder contain 0.2% FURACIN (brand of nitrofurazone), in water-soluble vehicles.

FURACIN Soluble Dressing supplied in: 2 oz. tube; 4 oz., 1 lb. and 5 lb. jars.

*Shipley, E. R., and Dodd, M. C.: Surg., Gynec. & Obst. 84:286, 1947.

FURACIN® soluble dressing

EATON LABORATORIES, Norwich, N.Y. NITROFURANS a new class of antimicrobials neither antibiotics nor sulfas


Preceptin
simple, effective conception control
Ortho
PRECEPTIN
vaginal gel

postpartum

routine in the six-week checkup

A GENERAL PHYSICAL, including blood and urine

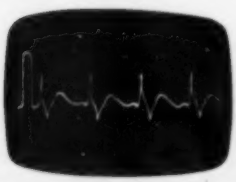
B THOROUGH PELVIC EXAMINATION

C CONTRACEPTIVE COUNSEL

SIMPLE, EFFECTIVE CONCEPTION CONTROL

Ortho

Lasker Award statuette



an acknowledgment

We are proud that our television series on the NBC network, "The March of Medicine", has been selected to receive the first Albert Lasker Award in the field of television and radio.

But we feel that those really being honored are you—the physicians and research scientists of America.

Your sense of responsibility to the public—and that of your hospitals, laboratories, and staffs—has made it possible for "The March of Medicine" to report the story of medical progress.

The Lasker Awards heretofore have been bestowed on many of the nation's outstanding medical scientists and journalists. As a member of the pharmaceutical industry, we are particularly grateful for the honor represented by this award.

We are also grateful for the support we have continually received from the American Medical Association, which has cooperated in this series from the very beginning.

Francis Boyer

Francis Boyer
President
Smith, Kline & French Laboratories

Calendar of Meetings

ASSOCIATION OF AMERICAN MEDICAL COLLEGES 67th Annual Meeting November 12-14, 1956 Broadmoor Hotel, Colorado Springs, Colo.

American Medical Association Annual Meeting—June 11-15; Chicago, Ill.

American Heart Association Annual Meeting and Scientific Sessions—Oct. 27-31; Cincinnati, O.

International Professional Union of Gynecologists and Obstetricians—Sept. 28-29; Madrid, Spain.

The World Medical Association—October 9-15; Havana, Cuba

American Medical Women's Association—June 7-10; Sheraton-Blackstone Hotel, Chicago, Illinois.

National Society for Crippled Children and Adults—Oct. 28-31; Hotel Statler, Washington, D.C.

International Congress of International College of Surgeons—Sept. 9-13; Palmer House, Chicago, Illinois.

Index to Advertisers

To extol their pedagogical value to you and your students.
YOU alone will be the judge!

1956 Releases NOW!

New Book!
SYNOPSIS OF CONTEMPORARY PSYCHIATRY

by
GEORGE A. ULETT, B.A., M.S., PH.D., M.D. AND D. WELLS GOODRICH, M.D. 350 Pages, PRICE $5.25

"The psychiatrist pulled the answer out of his hat and the patient again became a normal member of society."

The trained psychiatrist very often creates that impression.

BUT—The non-specialist dealing with psychiatric problems must have a source of quick reference information which is readily available.

Here is the answer—not in his hat but in his pocket.

1. It is a diagnostic handbook with the new nomenclature of the American Psychiatric Association.
2. A pocket book for quick reference to diagnostic criteria, drug dosages, etc.
3. No other book presents the multi-disciplined synthesis as well.

New Edition!
BING'S LOCAL DIAGNOSIS IN NEUROLOGICAL DISEASES, 14th Edition

by
WEBB HAYMAKER, M.D. 478 Pages 225 Illus. (9 in color) PRICE $16.75

Your students do not need an Erle Stanley Gardner to solve the mysteries of neuro-anatomy and clinical neurology.

This is not a Who-Dun-It.

It is a simple basic text of principles on localization of lesions in the central nervous system. It covers basic functional anatomy on which diagnosis of diseases and other disorders of the central nervous system rest, together with correlation of the anatomy with signs, symptoms, and syndromes.

It may be used for a brief or extended course in neuro-anatomy or clinical neurology.

Every aspect in the field has been brought up to date. An abundant bibliography is included.

New atlas type drawings make it unnecessary for the student to make constant reference to an anatomy text for the information he needs.

New Edition!
THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS, 6th Ed.

1180 Pages, 980 Illus., TENT. PRICE $18.50

by
JOHN ALBERT KEY, B.S., M.D., F.A.C.S. and H. EARLE CONWELL, M.D., F.A.C.S.

"TRIED AND TRUE." No more appropriate phrase could be used for this, the Bible for many years.

Here is the text many medical educators and clinicians say "has no equal."

It has been used in some of this country's leading medical schools.

It gives the medical student the latest information in the fundamentals of the treatment of fractures and the pathology of trauma.

It emphasizes conservative treatment in fractures, the basic pathology of trauma, the physiological repair of bone, and carrying out internal fixation when necessary.

It discusses the intra-medullary nail and warns against its indiscriminate use.

New Edition!
SYNOPSIS OF GENITOURINARY DISEASES, 6th Edition.

by
AUSTIN I. DODSON, M.D. and J. EDWARD HILL, M.D. Approx. 325 Pages, 124 Illus. PRICE $4.85

We could say this is the book you should use because it covers:

1. Etiology and pathology of disease.
2. Knowledge of diagnostic methods.
3. Recognized principles of the practice of urology.
4. Indications for cystoscopy and other specialized methods of diagnosis and treatment.

BUT WE WON'T.

You must see it yourself and then decide if these features and the following are desirable:

1. It is concise and understandable.
2. A new section on minor surgical procedures.
3. Up to the minute on antibiotics and chemotherapeutic agents.

Your students will value your good judgment and will use it as a source of constant reference in their professional careers.

Releases by

3207 Washington Blvd., St. Louis 3, Mo.

American Board of Psychiatry & Neurology — Some Reflections

KENNETH APPEL

DURING two terms on the American Board of Psychiatry and Neurology one sees many changes in personnel and leadership. Numerous problems and issues arise and recur. Criticisms and suggestions are received from without and within the board. There is nothing dull, static nor ineluctable about the board's deliberations, policies or practices. Various points of view in our respective disciplines are represented. There is for the most part sympathetic understanding of differences. There is responsiveness to a variety of needs and pressures—whether traditional, educational, ideological, pragmatic or social. Stimulation, response, growth, continuity and change are vital signs indicating that this is no mere formal, official, moss-backed institution. It is one that shares in the life of the professions involved and enables them better to serve society.

The membership is of men—as yet no women have been elected to the board. However, women have contributed in important ways to the organization and conduct of the examinations. Certain characteristics have distinguished the membership. They have been men of clinical experience and eminence in their fields. They have assumed responsibilities in education. Many have attained distinction as scholars. Many have been engaged in research, in extending the frontiers of knowledge. A life of work, devotion and contribution has provided disciplined experience, resulting in a kind of integrity which comprehends the social uses and obligations of our knowledge.

Members of the board have taken their responsibilties seriously and have devoted themselves and their capabilities unstintingly to problems as they have arisen. Long hours have been devoted to routine work and discussions over difficult decisions and policies, only occasionally relieved by some spicy, earthy humor. Never shall I forget the hours, days, nights, devoted to wading through varied and unsystematic reports of training programs, in which administrators were striving to attain status and accreditation for a training facility often only in the project stage and built on most meager budgets and personnel. Or the work of the credentials committee—hours again plowing through the qualifications of candidates whose peripatetic training, interrupted during the war years, was a patchwork of a bit here and a bit there, often in programs of un-

Dr. Appel is professor of psychiatry and chairman of the department at the University of Pennsylvania School of Medicine. This article is taken from remarks made to the American Board of Psychiatry and Neurology on retiring as president of the board, in New York City, December 12, 1954.

certain quality. No one can realize what these records were like in their diversity, complexity, incompleteness and general unsatisfactoriness in the early years, until Dr. David Boyd and Dr. Bernard Alpers organized forms for the systematic gathering and recording of the material. And here let me say that American psychiatry and neurology should never forget its obligation to the Mayo Clinic which has made possible the almost unlimited time and invaluable services of Dr. Frank Braceland and Dr. David Boyd, who systematized and functionalized the board in large measure and helped to make it the smoothly running organization it is today. They are also greatly responsible for the good will and respect which the board enjoys.

Then as to conscientiousness—late in the evening, approaching midnight, a director has felt that perhaps some candidate's record and examinations were dealt with too hastily or injudiciously. The candidate's card is drawn, the details of the examinations and the comments of the six different examiners are again reviewed. Not infrequently one of the neurologists advanced the grade of a candidate to enable him to pass even though the candidate's knowledge of neurology might leave much to be desired, because, in the opinion of the board as a whole, he deserved to pass.

My experiences on the board have been enlightening, heartening and inspiring. Because of my associations with the board I am sure I have been a better teacher and have made a more effective contribution to psychiatry—whether as a mental hospital consultant, a member of the Central Inspection Board, of the Hospital Committee, the Council, or as President of the American Psychiatric Association.

Progress of the board

The purpose of the board has been to increase the quality of practice of psychiatry and neurology by improving educational and training programs. This has been done by:

1. Publishing suggestions as to certain practical minimal standards for the accreditation of three years of training.
2. Inspection by a representative of the American Medical Association and accreditation by the board.
3. The assessment of the training and experience of individual candidates.
4. An examination by colleagues.

My period of eight years on the board has offered a purview of current trends in psychiatry and neurology and the ways they have been met by the board. My remarks are limited to psychiatry. As to neurology-for-psychiatrists, there has been distinctly less emphasis on detailed neurology and histopathology. Neurology has become less rigid, obsessive and hostile; some used to say sadistic. It has become more functional, pragmatic and existential.

Psychiatry has become less psychobiological. I doubt whether board members now could make accurate distinctions between the holergasias and the meregasias of Adolph Meyer. Psychiatry has become less ergastic and more orgastic. The ultimate value of this ideological and semantic shift is questioned by many. Instead of the longitudinal or biographical point of view, one now speaks of psychodynamics or psychogenetics. Psychiatry has become concerned with psychodynamics. Many psychoanalytic concepts have become part of standard psychiatric thinking. Psychiatry has become less nosological and descriptive, more speculative. It may be difficult to obtain a diagnosis from pres-

ent-day candidates. The diagnosis may be frequently mistaken because of the lack of experience of many current trainees with psychotic or chronic conditions and the natural history of different diseases. As to the diagnosis, there is less accuracy and more modesty. One observes more emphasis on dynamics and increased facility in speculation. Much psychiatric thinking is removed from the readily observable and confirmable to the theoretical, formularized and disputable. Psychiatry in many areas has almost become psychodynamics and intensive pyschotherapy. Patient examinations, case conferences and formulations have tended to become stream of consciousness reports, a la Gertrude Stein or James Joyce. Such accounts are followed by speculations often defensively evangelical, formulated by different schools in various intellectual frames of reference. This becomes difficult for students. Differences diverge into speculations or dogmatic theorizations, with hypotheses asserted as facts. Much terminology is hypostatized and taken for explanation. There is thus a broad spectrum: from observation and report through hypothesis, theory, and speculation to fantasy. The board has maintained a comprehensive or holistic point of view with objective emphasis—avoiding stuffy, stagnating conservatism on the one hand, and radical, charismatic departures from accepted order and system on the other hand. It has not been the board's function to stimulate or examine in experimental education or theorization. This is the function of educational centers.

Development of training standards

Training standards have been greatly improved in the various training facilities throughout the country. Candidates have been afforded better growth experiences. Thinking has become more involved and complex. Broader points of view are available, though much is to be desired in the way of thinking through, assembling and evaluating evidence. Hospitals take the training programs seriously and make efforts continually to improve them and advance the board's rating.

At one time it seemed to me there should be more rigidly defined training programs. I wrote a rather extensive outline for training in each of the three years. However, I believe the board was wise to maintain flexibility of requirements. This allows for development of a program in accordance with local circumstances—facilities, budget and personnel. It promotes leadership of a distinctive character in various centres. It allows for educational experiment. It avoids dictatorship of training and controlled education.

It would seem to me fruitful in the long run for psychiatry to encourage more experimentation in the development of training facilities and more liberal acceptance of credentials—as for example credit for: training in internal medicine, pediatrics, biochemistry, physiology, neurophysiology, and public health; the type of research that Halliday reported in "Psychosocial Medicine," sociology, anthropology, psychology; even the philosophy and logic of scientific method; and acceptance for credit and special examination, if need be, by specialists in their fields. I believe this would enrich psychiatry. Certainly increasing emphasis on the social sciences is needed for comprehensive psychiatry. This does not seem to me to point to the desirability of eliminating neurology and neurophysiology from the training and examination in psychiatry, as

some would maintain. If psychiatry oriented itself purely along the lines of psychological and social phenomena it would lose its connection with comprehensive medicine. It does not seem desirable to dissociate the mind from the anatomical, physiological and clinical aspects of the soma (including the nervous system) no matter how lacking our knowledge of correlations appears to be. Once this step of dissociation is taken, the differences between the psychiatrist, the psychologist and the counsellor will approach the vanishing point—and differential diagnosis and the care of the patient may deteriorate. Who will prescribe shock therapies? Who would use chlorpromazine and reserpine wisely?

We need *not eliminate* but *increase* integration of both biological and social sciences into psychiatry and psychology. This requires more experimentation. The board can encourage research by according it more creditation. We need more help from the neurologists in neuroanatomy, in neurophysiology, in neuroendocrinology and in neurochemistry, in understanding the complex phenomena dealt with and in training and teaching.

Examinations in neurology for psychiatrists today are most elementary and liberal. They really are given to determine whether the candidate is safe and can be depended upon not to make gross blunders in overlooking significant neurological disturbances. We must remember that psychiatrists in many centers of our population are called upon to give neurological consultations. The organic fund of knowledge is meager enough in most candidates. With the difficulties that exist for training in elementary neurology, it is unrealistic to expect that any significant number of candidates could be prepared to take examinations in internal medicine as a substitute for neurology, as some have suggested. Study of the disembodied psyche may be profitably encouraged for research workers and extraordinarily gifted colleagues, but not for run-of-the-mill psychiatrists. Psychiatry as such a discipline would become more speculative, visionary, impractical, dogmatic, and divisive. It would separate us from our medical colleagues. Our effectiveness and public relations would deteriorate.

A need for further learning

I cannot help quoting from Dr. William T. Lhamon in a discussion on psychiatric education:

"Sometimes I feel we narrow our topic and give too much information and allow too little dissent. The words of Cromwell apply here: 'I beseech ye in the bowels of Christ, think that ye may be mistaken.' Despite the undoubted fact that one of the most significant developments in psychiatry in the century has been the evolution of an hedonic motivational psychology as developed by Freud and his colleagues, we almost certainly have not arrived at a final position. The "answers" are not all in. No impressive proof other than that stemming from authority and personal conviction is available to show that our greater understanding in this area has lessened the problem of mental disease. The engrossing study of psychodynamics has produced nothing comparable to the effects of anti-syphilitic therapy in paresis, or the use of nicotinic acid in pellagra, or perhaps to the use of electricity in depressions. No doubt this comment will be seen by some as representing a point of view a little to the right of McKinley. Never-

theless, I fear, as I listen to the plans and review our current teaching of medical students that we are not opening enough pathways for those who must follow us."*

Hilaire Belloc makes some trenchant observations for us in his "Cautionary Verses on the Microbe:"

"But scientists, who ought to know,
Assure us that they must be so—
Oh! Let us never, never doubt
What nobody is sure about!"

Notwithstanding the tremendous contribution of psychoanalysis, its separation from biology, medicine and neurology to me seems unwise. The concepts of stress should not be thought of alone psychologically as the work of Selye and Wolf and Wolff has shown. Psychophysiological medicine is a solid bridge that should be widened and extended and not eliminated.

Some day the problem of giving partial credit for psychoanalytic institute training will come up. I would hope this could be worked out if, along with this, there could be an examination in psychophysiological medicine by an internist and physiologist, emphasizing the requirements of precision and knowledge in these fields.

It seems to me the board has wisely fought shy of subspecialties. There would be no end to them. Internecine conflicts in fields that have applied for subspecialty examinations are not the board's job to solve.

The board has wrestled thus with great problems and conflicts in the heart of psychiatry. Controlled education; dictatorship of training; rigidity versus flexibility in education; the elimination of neurology from psychiatric experience; the subspecialities; the accreditation of psychoanalysis—these are important problems not only for the board but for American psychiatry.

Reference should be made to another problem which will be worked out ultimately by the establishment of training centers which would integrate and coordinate the facilities of hospitals, clinics and teaching units in a given section of the country.

Should training in psychiatry be *apprenticeship or graduate study?* In apprenticeship training, application is emphasized. Accepted and tried concepts are communicated as knowledge to trainees. Understanding, theories, explanation, "causes," correlations are acquired. Techniques of help or skills are learned. Practice is afforded.

However, graduate education is not limited to the acquisition of skills. It considers the development of knowledge—research. Here is encouraged: 1. The cultivation of disciplined curiosity and the spirit of free inquiry. 2. The development of the capacity to ask questions, to doubt. 3. The development of broader concepts and the bringing in of concepts from other fields and disciplines. 4. The development of new concepts and insights, which increase understanding and effectiveness, not merely the learning of the old.

The American Board of Psychiatry and Neurology can stimulate a broader, richer, more effective psychiatry by bearing in mind in its deliberations and discussions some of these matters presented for consideration.

*From "Remarks on the Department of Psychiatry," by Dr. William T. Lhamon, professor and chairman of the department of psychiatry, Baylor University Medical School, Houston, Texas, in *J. Med. Educ.*, Vol. 30, No. 6, June 1955.

Un Discurso ante el "American Board of Psychiatry and Neurology."

En un discurso de despedida, pronunciado en Nueva York el 12 de diciembre de 1954, ante sus colegas del "American Board of Psychiatry and Neurology" (o sea la Comisión de Exámenes, del Estado, que concede las licencias para practicar) el orador (M.D., Ph.D., Sc.D., Jefe del Departamento de Psiquiatría de la Universidad de Pennsylvania) comentó sobre sus propias experiencias y sobre los cambios que tuvieron lugar durante sus dos términos como Presidente de esa Comisión en lo que se refiere a la teoría y a la práctica en el compo de la Psiquiatría. Elogió la actitud del "American Board of Psychiatry and Neurology" frente a esos cambios (uno de los más importantes quizás fuera la influencia del Psicoanálisis en la Psiquiatría) ya que supo evitar los extremos y reconciliar puntos de vista opuestos en beneficio de la profesión médica y de la Sociedad en general. Por sus deliberaciones y decisiones sobre los principios y problemas de la educación médica, esa Comisión tiene un papel importante en el desarrollo científico y social de la Psiquiatría y puede y debe servir cada vez más como fuerza alentadora.

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

"Survey of Teaching Radiology in U. S., Canada and Puerto Rico"

In the article "Survey of Teaching Radiology in the U. S., Canada and Puerto Rico," which appeared in the May issue of the Journal, the names of Dr. Philip Hodes and Dr. Everett Pirkey were inadvertently omitted from the author identification paragraph. They both served on the Subcommittee of the Commission on Education, and were directly responsible for the compiling of the questionnaire.

A Controlled Comparison of the Project Method with Standard Laboratory Teaching in Pharmacology

AVRAM GOLDSTEIN

LABORATORY EXERCISES OCCUPY a major fraction of the student's time during the preclinical years of medical school. Usually laboratory teaching is designed for representative coverage of the subject matter of each course. In pharmacology, as in the other experimental preclinical disciplines, there has been considerable standardization of the exercises, with the result that the laboratory manuals have tended to evolve into nearly perfect "cookbooks" for repeating pretested demonstrations. As the manuals have "improved," so has the intellectual challenge diminished. One reaction to this has been to supplement standardized exercises with projects that call upon the student to plan, execute, and interpret experiments, in order to throw light upon real problems. The project approached, in general, sacrifices breadth of coverage for depth of application to a single problem. To what extent such a change in emphasis is thought wise will depend upon one's estimate of the teaching value of standardized laboratory experiments. Heretofore such estimates have tended to be highly subjective.

Dr. Goldstein is presently chairman of the department of pharmacology, Stanford University School of Medicine, San Francisco. The comparison described in the above article was undertaken by Dr. Goldstein when he was assistant professor of pharmacology at Harvard Medical School.

The large amount of time spent on standardized laboratory exercises might contribute to the student's education in a number of general ways unrelated to any particular discipline, e.g. by acquainting him with principles and methods of biological experimentation, by teaching the importance of careful observation, by providing an opportunity for personal contact and discussion with instructors.

It is generally assumed that laboratory instruction also serves an important purpose in supplementing lectures and textbooks by amplifying, illustrating, dramatizing, and extending the subject matter of each course. We questioned the validity of this assumption and sought by experimental means and as objectively as possible to appraise the contribution of standardized laboratory exercises to the student's knowledge of pharmacology.

Design of the experiment

At the beginning of the course in September 1954 at Harvard one quarter of our second-year class was assigned, by means of a table of random numbers, to a special "project laboratory group," the remainder of the class constituting the "regular laboratory group." Among the 128 members of the class were 14 dental stu-

dents; the randomization placed two of these in the project group and 12 in the regular group, but because of their different background and interests, they were excluded from consideration in analyses of the data. Four medical students who had received instruction of a unique kind during their first year were not included in the experiment but were arbitrarily assigned to work together as a team in the regular laboratory. The results to be reported here therefore relate to 30 students in the project laboratory and 80 in the regular laboratory. Within both groups students were assigned randomly to teams of four and to instructors.

The "regular laboratory" course consisted of standardized exercises dealing systematically with various aspects of pharmacology. Because these exercises had evolved and been modified through staff and student criticism over a period of years, we felt they were probably as favorable representatives of their type as would be found anywhere. The distribution of the 14 exercises of three hours each, according to subject-matter area, was as follows: drug distribution and excretion—1; general anesthetics—2; analgesics—2; analeptics and anticonvulsants—2; autonomic drugs (blood pressure, eye, gut)—6; cardioactive drugs—1. The students themselves were subjects for three exercises; the remainder dealt with animals.

The "project group" occupied a separate laboratory, was requested not to visit the regular laboratory, did not receive a laboratory manual, and was exempted (in writing and orally) from any responsibility for knowledge of the regular laboratory work. Instead each team was to pursue a single randomly-assigned project throughout the semester. There were four such projects, carefully devised by the department staff. Two teams worked independently on each project under the supervision of different instructors so that each of the two instructors was supervising all four projects. The projects were based upon investigations recently reported in the literature. The students were furnished with a brief general statement of the problem and references to some relevant published work. Precise definition of the problem and the methods for investigating it were left for the students to work out under instructor guidance. The project laboratory was, by design, as extreme an example as we could devise of an educational method requiring maximum student initiative, ingenuity and persistence, with minimum instructor intervention. Over the course of 14 laboratory sessions of three hours each (the same time as devoted to regular laboratory) each team of students discussed and formulated their single problem, gathered background information in the library, sought appropriate methods in the literature, gathered equipment, ordered animals, perfected techniques, designed experiments, collected and analyzed data, interpreted their results and presented an oral report to their colleagues of the project group.

Precautions were taken to ensure that the project and regular laboratory groups would differ only in the variable under study. The project students were instructed not to spend, during the whole semester, more than the regularly scheduled time; free time was provided to compensate for experiments of over three hours duration. The ratio of eight students per instructor per session was the same in project and regular laboratories.[1] The two instructors in the project laboratory were capable investigators with a sincere interest in teaching but they were not our most

experienced teachers or our best qualified pharmacologists. In this as in other respects we sought to establish the project laboratory under such realistic conditions that our findings would have equal validity for a whole class and a customary number of instructors. The students were told that we were conducting a limited trial of the project method of teaching but were not apprised of the specific aims of the experiment. Criteria for evaluation were never discussed with any student nor were any results revealed to students during the course of the experiment.

Criteria

Within the framework of this experimental design we set out to test the hypothesis that the coverage provided by standardized laboratory exercises in pharmacology does not materially contribute to the student's formal knowledge of the subject. We also sought to discover whether the extreme type of project laboratory experience described here would improve the student's ability to comprehend and interpret published experimental work in the medical sciences. We agreed in advance upon the following wholly objective criteria and adopted the 5 per cent level of significance for all interpretations of data.

1. As a base line for reference and a check on randomization, we chose the combined performance of the students on final written examinations in physiology and biochemistry at the end of their first medical school year, four months before the start of our experiment.

2. As a running comparison of the project group with the regular group in respect of their formal knowledge of the content of our course, we used the scores on our four hour-examinations in November, January, March and April. These and all other examinations were graded "blind," each student's paper being identified by an examination number.

3. As ultimate criterion of formal knowledge of pharmacology we agreed to accept the students' performance on a two-hour "objective type" final examination. To avoid any possibility of unconscious bias in favor of either student group we used an examination devised at another school without knowledge of the existence of our experiment.[2]

4. As criterion of ability to comprehend and interpret published experimental work we decided to use the students' performance on a one-hour special examination devised by us. This was based upon two papers about the action of cardiac glycosides on the embryonic chick heart (KEYL and DRAGSTEDT; *J. Pharmacol. Exper. Therap.* 110: 411, 112: 129, 1954). The students were given only the introduction, methods, and raw tabular data but not the authors' conclusions or discussion. They were then asked to summarize and interpret the findings. Grading was on a pre-arranged point system. Each paper was read and graded independently by three instructors and seriously discrepant results were re-evaluated at a staff conference.

5. As a concurrent control on performance of the project and regular groups in another major second-year course we used the final written examination scores in pathology.

6. As a measure of student attitudes toward the laboratory experiences of both types we analyzed the responses to a questionnaire circulated to the whole class after the end of the laboratory course. The project groups were also interviewed in round-table conferences after the questionnaire had been returned.

TABLE 1

The four projects and some retrospective staff evaluations of them

Project	Material used	Technical difficulty	Results	Student enthusiasm
Barbiturate (B)[1]	Whole animal	x	xxx	xx
Chlorpromazine (C)[2]	Whole animal	x	xxx	xxx
Decamethonium (D)[3]	Tissue	xxx	x	x
Histamine (H)[4]	Tissue	xx	0	x

[1]To study the difference in duration of sleep in male and female rats after administration of various barbiturates, and the effects of castration and hormones thereon.

[2]To study the possible analgesic action of chlorpromazine and its reported potentiation of analgesic effects of other drugs.

[3]To study the properties of neuromuscular blockade induced by decamethonium and the possible change in type of blockade with passage of time in the continued presence of the drug.

[4]To study the histamine-like substance released from uterus contracting in anaphylaxis and to identify it if possible. (This project foundered on an unexplained failure of the guinea-pigs to be sensitized by the antigens used.)

Final results

Table 1 summarizes the content of the four projects and indicates some retrospective staff judgments about each. The barbiturate (B) and chlorpromazine (C) projects entailed no technically difficult procedures; in the former the duration of sleep in rats after barbiturates and in the latter the time required for mice to show discomfort on a hot plate after chlorpromazine and various analgesics were the only parameters measured. Whole animal responses were under investigation, a rich harvest of positive results was obtained, and student enthusiasm ran high. In contrast the decamethonium (D) and histamine (H) projects required considerable technical proficiency; in the former the contraction of muscle in the intact cat was measured under electrical stimulation and close intra-arterial infusions of drugs, while in the latter the response of guinea-pig uterus in a tissue bath was examined upon introduction of histamine or antigens to which the animal had been sensitized. Here isolated tissues were under study, positive results were scanty, and many of the students lost interest or even became resentful, as detailed under the analysis of questionnaire responses. Because of these manifest differences between the B and C projects on the one hand and the D and H projects on the other, and because they differed significantly on the various objective criteria, we are presenting the data separately for these two halves of the project group.

Table 2 shows that the project group (especially its B + C half) performed somewhat less well than the regular group in physiology-biochemistry but the difference is not significant. We conclude that randomization was adequate. The dental group mean does differ significantly from that of the regular group. It is included here and in some subsequent tables to serve as a fixed point of reference against which to judge the importance (as distinguished from statistical significance) of observed examination score differences. Since the dental students as a group are highly capable we would not consider it of any practical importance if the mean score of a medical student group fell, for example, by only

TABLE 2

Combined examination scores in physiology and biochemistry the previous semester

	Mean combined score	S.E.	Per cent of regular group mean
Regular group	160.6	1.3	100.0
Project group	157.2	2.2	97.9
B + C	155.6	3.6	96.9
D + H	158.6	2.5	98.8
Dental group*	145.0	3.7	90.3

*The 12 dental students subsequently assigned to the regular laboratory.

TABLE 3

Scores on pharmacology hour examinations

	November			January			March		
	Mean score	S.E.	Percent of regular group mean	Mean score	S.E.	Percent of regular group mean	Mean score	S.E.	Percent of regular group mean
Regular group	79.0	1.5	100.0	82.4	1.8	100.0	94.0	0.9	100.0
Project group	76.7	2.3	97.1	79.2	2.8	96.1	88.2	1.6	93.9
B + C	77.1	3.5	97.6	81.8	3.3	99.3	90.3	2.0	96.1
D + H	76.4	3.1	96.7	76.7	4.5	93.1	86.4	2.4	91.9
Dental group	73.5	4.2	93.0	74.9	6.2	91.0	92.7	2.8	98.8

a small fraction of the gap separating it from the dental group mean.

Table 3 again suggests that the project group may have been slightly less proficient academically than the regular group at the beginning of the experiment. However, already on the November examination the relative standings of the B + C and D + H halves of the project group are reversed. On the subsequent two examinations the B + C performance improves or remains stable while the D + H performance deteriorates. On the March examination the performance of the project group as a whole is significantly worse than that of the regular group, due almost entirely to the poorer scores of the D + H component. Since the progressive decline in examination scores occurred in the D and H projects but not in the B and C projects, it does not seem possible to attribute it to omission of the regular laboratory exercises. Moreover, the March examination, on which the D and H groups registered their poorest performance, dealt exclusively with fields given no coverage whatever in the regular laboratory. Interestingly, on the January examination, which covered the area most intensively studied in the regular laboratory, the B and C project groups did as well as the regular group. We shall return later to a discussion of the possible reasons for the decline of the D and H groups.

The laboratory groups were in session throughout the months of October, November and January. The November examination dealt principally with the central nervous system, the January examination with the auto-

nomic nervous system and circulation, the March examination with blood, kidney and hormones. An April examination covering chemotherapy was graded into only three major categories; the regular and project groups did not differ but since discriminatory power was thus forfeited the data are omitted here.

than that of the regular group but the decline is entirely attributable to the D and H groups alone. The magnitude of this decline is small, the D + H group having fallen (from the physiology - biochemistry baseline) only about one-third of the distance to the dental group. On the other hand the B and C groups may have

TABLE 4

Scores on pharmacology final examination
This examination was on the subject matter of pharmacology

	Mean score	S.E.	Percent of regular group mean
Regular group	164.9	1.6	100.0
Project group	159.2	2.9	96.5
B + C	161.4	4.0	97.9
D + H	157.3	4.1	95.4
Dental group	148.0	4.9	89.8

Table 4 presents the mean scores on the externally devised final examination. This test was chosen for its excellent discriminatory power and because after careful study our staff agreed that it would test knowledge of the various areas of pharmacology in a thorough and fundamental way. The examination did in fact spread our class widely. By interquartile boundaries, the range of scores was 120-152-163-175-198 and of percent correct answers, 53-67-72-77-88. That the spread correctly reflected differences in student knowledge of pharmacology is indicated by a highly significant correlation between scores (for each student) on this examination and on all the hour examinations combined ($r = 0.62$). The reliability of this examination is also attested by the performance of the dental group, which stands in almost exactly the same relationship to the regular group as on the physiology-biochemistry examinations of the previous year (Table 2). On this examination the mean score for the project group as a whole was significantly lower

improved their relative standing slightly.

A more sensitive evaluation was attempted by letting each student be his own control and calculating the change in his absolute score and rank position from physiology-biochemistry to our final examination. The absolute scores were in both instances arbitrary and the mean change for the whole class happened to be +3.9; the mean change in rank for the whole class is necessarily zero. The mean absolute and rank differences of randomly selected groups of students should scatter about these two means. Table 5 presents the results of such an analysis for the two halves of the project group, for 6 units of similar size randomly chosen from the regular group, and for the dental group. Here again the D and H project groups show a relative decline which is significant when expressed as an absolute score difference (single tail t-test).

Table 6 presents the mean scores on our special examination, designed to test ability to comprehend and in-

TABLE 5

Differences, calculated for each student, between physiology-biochemistry and pharmacology performance

Data are for pharmacology final examination score MINUS physiology-biochemistry combined final examination score

	N	Mean absolute difference	S.E.	Mean rank difference	S.E.
Regular group	75*	+4.5	1.4	+1.9	3.2
Subunit 1	11	+3.5	3.0	+1.0	11.3
Subunit 2	13	+5.8	2.5	+1.1	7.3
Subunit 3	11	+3.4	2.8	—2.4	6.6
Subunit 4	11	+4.4	2.2	+6.0	6.9
Subunit 5	15	+2.3	1.3	—2.1	6.4
Subunit 6	14	+7.2	3.6	+5.2	9.1
Project group	30	+2.0	2.2	—2.8	4.7
B + C	14	+5.7	3.3	+5.1	7.4
D + H	16	—1.2	2.8	—9.7	5.7
Dental group	12	+3.0	5.5	not calculated	

*Four students are omitted here because they did not take the same physiology or biochemistry final examination as their classmates, and one because he did not work in a regular laboratory team of 4.

TABLE 6

Scores on pharmacology "special examination"

This examination was designed to test ability to understand and interpret published experimental work

	Mean score	S.E.	Percent of regular group mean
Regular group	61.4	1.3	100.0
Project group	60.2	2.3	98.0
B + C	60.4	1.2	98.4
D + H	59.9	2.9	97.6
Dental group	51.3	5.4	83.5

TABLE 7

Scores on pathology final examination

	Mean score	S.E.	Percent of regular group mean
Regular group	89.0	0.4	100.0
Project group	89.5	0.5	100.5
B + C	89.8	0.8	100.8
D + H	89.2	0.6	100.2
Dental group	85.7	1.0	96.2*

*The apparently higher than usual relative standing here is an artifact arising from the narrow spread of the examination scores. The dental group mean is significantly lower than the regular group mean.

terpret a scientific paper. This test was deliberately constructed to favor those qualities and capacities we hoped were being fostered by the project laboratory experience. Yet there is no evidence of superior performance by either half of the project group, although the relative standing of the D and H groups was distinctly better than on the formal final examination given at the same sitting.

Table 7 shows that the performances of the regular group and both halves of the project group were practically identical in a simultaneous major course, pathology.

Table 8 presents responses to the three principal questions put to all students in an attempt to assess attitudes toward the laboratory work. Question I reveals that whereas three-fourths of the regular group would choose laboratory work voluntarily instead of free time, only one-third of the project group would so choose. Questions II and III indicate that whereas only about 15 per cent of the regular group considered laboratory work not valuable and did not enjoy it, 47 per cent of the project group responded in this way. These differences between the project and regular groups are all significant. The preponderance of negative responses to all questions by the D and H teams is noteworthy.

The two teams that had worked on each project were brought together for a conference with some of the staff. The same striking difference in

TABLE 8

Selected questionnaire responses

I. Suppose a student in next year's class were given a choice between the kind of laboratory experience you had and no laboratory at all (that time being free instead). On the basis of your laboratory experience this year and its value to you how would you advise such a student?

	Regular Group	Project Group	
		B + C	D + H
1. Choose no laboratory at all	20	7	12
2. Choose laboratory	59	6	3

II. How worthwhile do you consider your laboratory experience in pharmacology from the standpoint of its educational value to you?

	Regular Group	Project Group	
		B + C	D + H
1. Extremely valuable	4	1	0
2. Moderately valuable	50	10	4
3. Neutral feelings about it	13	1	0
4. Not valuable on the whole but do not feel very strongly about it	9	2	5
5. Worthless	3	0	7

III. Regardless of what you think about the educational value of your laboratory experience in pharmacology did you enjoy it?

	Regular Group	Project Group	
		B + C	D + H
1. Yes, enthusiastically	5	1	0
2. Yes, moderately	46	5	6
3. Neutral feelings about it	17	3	1
4. No, but do not feel very strongly about it	9	3	4
5. Decidedly not	2	2	5

attitude between teams was evident. With but one student expressing slight doubts the conference with the C teams was given over to boundless enthusiasm for the project method. The students felt they had "learned something about what research is like", "had come to appreciate the difficulties of elucidating even small points by experimentation", "had come to be more critical about accepting unsubstantiated statements", and so on. The B teams were less enthusiastic but still expressed themselves in favorable terms. The D and H teams were generally critical and some students showed considerable hostility. The staff judgments embodied in Table 1 were influenced by these conferences as well as by the student presentations of their results and the experience of the instructors in the laboratory.

Conclusions

The data show that the project group as a whole performed slightly less well than the regular group (Tables 4 and 5), partly because of a somewhat lower initial baseline (Table 2) and partly because of inferior performances by the D and H teams alone. The magnitude of the project group deficiency is very small when referred to such a consistent small interval as the difference between the regular and dental group means. Therefore, even considering the total project group, including its poorer D and H teams, one cannot reasonably claim that omission of the regular laboratory course with its systematic coverage seriously affected the students' knowledge of pharmacology.

On the other hand, we could obtain no evidence that the semester of project work improved the students' ability to understand and interpret original published work. This may be because the examination we devised was inadequate but it seems more likely that the abilities we hoped to improve are too deep-rooted in the student's whole personality and intellect to yield to any external influence over so short a period as a single semester.

There are several valid grounds for regarding the project group as composed of two dissimilar sub-groups according to the projects under study. The B and C projects differed from the D and H projects in a number of respects summarized in Tables 1 and 8.

The former projects entailed simple techniques with whole animals, many positive results were obtained, and student interest and enthusiasm ran high. The latter projects differed in all these respects. The randomized design and the balanced assignment of instructors to the teams isolates the nature of the projects as the only variable between these two subgroups. On every criterion the B + C subgroup performed as well as the regular group. Curiously, it turned in its best performance on the hour examination that dealt with an area (autonomic nervous system) most intensively covered in the regular laboratory (Table 3).

Our main hypothesis is therefore strongly supported by the performance of students who had engaged in "successful" projects. On the other hand the D + H subgroup compared less and less favorably with the regular group as the year went on and performed distinctly more poorly on the objective final examination. However, on the "special" final examination which did not test knowledge of pharmacology the two subgroups differed very little, while in another course (pathology) the D + H group

did as well as the regular group. Thus the poorer performance of the D + H students was specific for the subject matter of pharmacology but unrelated to the omission of material covered in the regular laboratory course (cf. performance of B + C subgroup; and also D + H performance on March hour examination, Table 3). We conclude that the disinterest and latent hostility of students in the D and H teams, caused by the "failure" of their projects, spread beyond the laboratory to the pharmacology course as a whole, adversely affecting their academic performance. That a great variety of factors in the teaching of a course can influence student motivation has long been understood by teachers. Here we have a documented instance of negative motivation toward the subject-matter content of a course, resulting from an unpleasant laboratory experience largely unrelated to that content. However, the effects upon the D + H subgroup, although significant in the statistical sense, are relatively small, and it would be incorrect to suppose that these students are seriously deficient in their knowledge of pharmacology.

With the revelation that the nature of the project is of overriding importance we must ask whether, in the future, the success of every project could be ensured. We believe that, on the whole, simplicity of design and much freer instructor intervention would achieve this aim. The important lesson is that for medical students at this stage of their development the "sink or swim" philosophy is not applicable since those who cannot overcome the inherent difficulties not only lose interest in the project but are motivated negatively toward the whole subject of pharmacology.

Perhaps the primary value of this study is to show that teaching methods in the medical sciences can be evaluated objectively. Once criteria have been established and sufficient attention given to proper experimental design it is remarkable (as shown by our data) what small differences in academic performance can be reliably and consistently detected and related to the variables under investigation. Although in the present instance we feel justified in rejecting these small differences as trivial, there can be no question whatsoever about their reality.

Our principal finding is the clear demonstration that "coverage" in the regular laboratory course is unnecessary. Indeed, if a project can be substituted that will hold student interest and present no unusual technical difficulties the regular laboratory course can be omitted without adverse influence upon student knowledge of pharmacology. We suspect this is also true of the other experimental preclinical subjects and it would be interesting for biochemists, physiologists, and bacteriologists, who believe any part of their laboratory course is indispensable, to subject that belief to the test of experiment. The effect (if any) of omitting certain laboratory courses entirely and substituting free time could also be examined with profit. We believe the student's time during the preclinical years could be spent most effectively if the content of the various courses were taught without laboratory exercises. The several departments could then join forces in a single multidiscipline laboratory course designed to teach the principles of experimentation in the medical sciences with no attempt at coverage of any particular subject matter.

Acknowledgment

I am indebted to all my colleagues in the Department of Pharmacology

at Harvard for their hard work, sharp criticisms and lively discussions that carried this experiment along, and for their original ideas beyond count that have been incorporated everywhere; to Dr. Otto Krayer for permission to "draw people out of a hat" and thereby turn a mere novelty into an experiment; to Dr. Alfred Gilman for the use of his examination and to Dr. E. M. Landis, Dr. A. B. Hastings, and Dr. A. Hertig for making available the examination scores in their courses; to Moyra Laing, Ursula Offenbacher, and Alexandra Shedlovsky for expert assistance in working up the data. I owe thanks above all to the members of the class of 1957 whose loyal cooperation and splendid conduct really made the experiment possible.

[1]Actually 16 students per instructor but only half the students were scheduled to be in the laboratory on a given day.

[2]Dr. Alfred Gilman kindly made available the examination used the previous year at Columbia University College of Physicians and Surgeons.

Un estudio comparativo de la eficacia del método de "Proyectos" y del método de Ejercicios "standard" de laboratorio en la enseñanza de la Farmacología.

En la Farmacología, igual que en otras ramas de las disciplinas pre-clínicas, ha tenido lugar una creciente "standardización" de los ejercicios de laboratorio que ocupan gran parte del tiempo de los estudiantes durante el período pre-clínico. El resultado ha sido que los manuales de laboratorio se han ido convirtiendo en una especie de "libros de cocina" en los que sólo se insertan fijos y determinados experimentos. De ese modo el estímulo intelectual ha ido disminuyendo considerablemente. Para remediar ese inconveniente se ha tratado de suplementar los ejercicios "standard" con ciertos *proyectos*, que exigen de los estudiantes un esfuerzo mucho mayor al planear, ejecutar e interpretar experimentos que han de arrojar luz sobre problemas esenciales. Este último método tiende siempre a centrar la atención en un solo problema determinado. La cuestión de saber cuál de esos métodos experimentales (el extensivo "standardizado", o el intensivo, de *proyectos)* sería más valioso para la educación de los estudiantes de Medicina depende, claro es, en gran medida, del valor que cada uno atribuya a los experimentos "standardizados", y, por tanto, tales evaluaciones son a menudo muy subjetivas. El presente trabajo describe los esfuerzos llevados a cabo para comparar de un modo más objetivo los dos métodos.

Un estudio comparativo, a base de resultados, en el campo de la Farmacología, ha demostrado que un grupo de estudiantes que realizaron un solo proyecto de investigación, en vez de toda una serie de ejercicios "standardizados", mostraron tener, esencialmente, los mismos conocimientos de Farmacología que los estudiantes de otro que hicieron tan solo los ejercicios "standard". Este resultado sugiere que los cursos "standardizados" de laboratorio no son en modo alguno indispensables para adquirir un sólido conocimiento en las ciencias experimentales durante el período pre-clínico.

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

A Comparison between Lecture and Conference Methods of Teaching Physiology

NATHAN LIFSON, PETER REMPEL AND JOHN A. JOHNSON

THIS PAPER REPORTS on an attempt to evaluate objectively the effect of substituting conferences of the seminar type for traditional subject-matter lectures in the teaching of medical school physiology. At the outset it was recognized that uncertainties in the interpretations of the findings would arise because a number of pertinent variables were not controlled. The project was therefore considered primarily as a pilot study, the value of which might be to help in the design of future teaching experiments of a similar nature.

Design of the study

For the purpose of this study the medical freshman class in physiology (Spring 1952) was divided by random sampling methods, stratified on the basis of previous grades in the medical school, into two groups: (1) an experimental group of 28 students and (2) a control group of 81 students. All students had completed the same courses during the fall and winter quarters, including 25 quarter credits of anatomy and 13 credits of physiological chemistry. To test the effectiveness of the sampling procedure the two groups were compared by means of a pretest given three days after the start of the course. Pretest items were of the factual type, selected from former tests in physiology. No significant differences were observed in means or variability measures between the performance of the two groups' pretest scores. The assumption that the groups could be regarded as equivalent for the purposes of the study was thus supported.

The course in physiology extended for 16 weeks over the spring quarter and the first summer session. During this period the control group was treated as in the past, i.e. no changes were made in course content or teaching procedures. A weekly schedule consisted of six hours of lecture, six of laboratory, two of demonstration, and one of a conference or seminar meeting. For this weekly conference meeting the class was divided into five subsections of approximately equal size. In addition, all students attended a total of four correlation clinics, in which efforts were made to explain clinical material in terms of basic physiology.

The work of the experimental group differed from the above in that discussion sessions were substituted for about one-third of the lectures as follows: (a) Of the 95 hours of lecture time and 15 hours of conference time available throughout the course,

Dr. Lifson is professor of physiology, and Dr. Johnson is associate professor of physiology at the University of Minnesota Medical School. Dr. Rempel was a research fellow in the Bureau of Educational research at the University of Minnesota and is now at the University of Iowa.

only the first 60 were employed for the traditional lecture type of class meeting. During this period an attempt was made to cover, in condensed form, approximately the same topics to which the control group devoted 95 hours. The chief alteration of the lecture course consisted of reducing to 8 or 10 the usual 26 lectures on neurophysiology and the special senses. (b) The 35 hours thus freed from lectures were devoted entirely to student discussion of papers from the experimental literature in physiology, during the latter part of the term. Thus the control group attended a total of 95 lectures and 15 conferences, while the experimental group attended 60 lectures and 50 conferences. Two lists of papers from the research literature of physiology (*American Journal of Physiology, Journal of Physiology, Journal of Biological Chemistry, Journal of Clinical Investigation*, etc.) were compiled to include both classical and contemporary investigations. From the two lists assignments were made to students who later reported to the class on their assigned papers. These reports formed the bases for class discussions. The control group also spent some time in discussing such studies, but its assignments were drawn from the first list only and discussions were limited to the weekly seminars. In contrast, the experimental group completed both lists, and devoted all of their freed lecture time during the second portion of the experimental period to a discussion of this research literature.

While the substitution of literature discussion meetings for lectures was the factor we hoped to evaluate, there were other important differences in the treatment of the two groups.

One such difference occurred in the assignment of instructors. Two staff members were in charge of the experimental group for the entire course, while seven other staff members instructed the control group. Exceptions to the above follow. The two groups received 12 lectures in common; seven of these were given by the instructors of the experimental group, five by those of the control group. Laboratory, demonstrations and correlation clinics were also taken in common.

Yet another difference occurred in terms of emphasis on course objectives. The chief purpose of the course in medical physiology as held by the department of physiology at the University of Minnesota has been to help the students acquire the ability to formulate and analyze clinical problems in operational physiological terms. To accomplish this purpose, the work of the course has been organized in such a manner that the student is expected to acquire: (1) a reasonable knowledge of physiological facts or "text-book physiology;" (2) a knowledge of how important physiological variables are measured (i.e., by emphasis on measurements more or less unique to physiology); (3) the ability to evaluate critically experimental studies and to interpret their findings; (4) the habit of consulting original literature, both classical and current and (5) the habit of thinking in terms of the experimental approach to the solution of new problems.

During discussion periods the instructors in the experimental group made a special effort to stress items 2-5 above, but no such methodical attempt was made in the conduct of the control group.

While the two groups were thus differentiated in terms of time schedule, course, content, teaching personnel, and goal-emphasis, they maintained as before the same laboratory

schedule, conducted the seminar meetings in much the same manner, and presumably were seeking the same general course objectives.

Tests employed

The determination of effects due to the two different teaching procedures were sought through two course examinations (subject matter achievement tests) and an attitude inventory.

The first achievement test was a mid-term examination taken by the students about a week after the experimental group had completed the first or lecture portion of their program. At this time the two groups had attended an approximately equal number of discussion sessions. In the mid-term examination the questions were based only on those areas of the subject matter covered by the lectures to the control group. The second achievement test was the final examination of the course. All students took the same examinations. The first section (Part I) of both the mid-term and final examinations was prepared by the instructors of the experimental group; the second section (Part II), by the instructors of the control group.

All items on the achievement tests were analyzed individually for difficulty and discrimination by means of the Davis technique.[1] Approximately half of the items could be called "good" items in that they discriminated between high and low achievers and were within a suitable range of difficulty. Though this record is not particularly encouraging, it should be recalled that these were new items which had not been pretested.

The reliabilities of these measuring instruments were determined by use of the "Hoyt Analysis of Variance" technique[2] and were found to be sufficiently high for purposes of group measurement.

The attitude inventory consisted of 45 objective-type items designed to measure student attitude towards various aspects of the course. This was administered to the class at the time of the final examination in the course and again two years later, when the students were completing their junior year. The students were guaranteed anonymity for their answers.

Test differences on achievement tests

As shown in Table 1, the total scores of the experimental and control groups on both mid-quarter and final examinations were almost identical.

The achievement of the two groups could also be compared and interpreted in terms of test item source. These comparisons, (Table 2), indicated that students seemed to achieve better on items constructed by their own instructors. The experimental group earned significantly better scores on Part I of both examinations, sections developed by their own instructors. In like manner, scores earned by the control group were significantly higher than those of the experimental group in Part II of the mid-term and final examinations, sections developed by their instructors.

The student papers were regraded to yield two scores: One which combined items of what we have called the application type regardless of which instructors provided them, the other which reflected only the factual information-type items. To be sure, there is not always a clear cut distinction between the two types of items. But if an item presented to the students contained an element of interpretation, application or novelty, it was considered of the application type.

TABLE 1

Comparison Between Experimental and Control Groups in Scores Attained on the Mid-term and Final Examinations in Physiology 106-107

Examination	Prepared by instructors of group	Possible score	Experimental (E) N=28 M	Experimental (E) N=28 SD	Control (C) N=81 M	Control (C) N=81 SD	Mean difference[a]
Mid-term I	(E)	33	21.6	3.1	16.9	3.6	4.8**
Mid-term II	(C)	65	48.0	3.4	53.3	4.3	—5.3**
Mid-term Total	(E & C)	98	69.7	5.4	70.2	6.6	—0.5
Final I	(E)	60	43.4	4.5	35.3	6.2*	8.1**
Final II	(C)	74	49.3	4.6	57.4	4.8	—8.1**
Final Total	(E & C)	134	92.7	7.1	92.7	9.6*	0.0

[a] Tests of significance for differences between means or standard deviations have been indicated by asterisks: a double asterisk (**) denotes significance between means (t-test) or standard deviations (F-test) at the one per cent level; a single asterisk (*), at the five per cent level.

TABLE 2

Comparisons Between Experimental and Control Groups in Scores Attained on Information- and Application-type Items in the Mid-term and Final Examinations (Physiology 106-107)

Examination	Item Type[a]	Possible Score	Raw Scores: Experimental N=28 ME	Experimental N=28 SD	Control N=81 MC	Control N=81 SD	Mean Difference[b] ME-MC
Mid-term	Application	21	13.4	2.4	10.4	2.6	3.0**
Final	Application	34	23.1	2.9	20.2	3.9*	2.8**
Mid-term	Factual	77	56.3	4.7	59.8	5.2	—3.5**
Final	Factual	100	69.6	5.3	72.4	7.1*	—2.8*

[a] Application-type items and factual information-type items have been combined regardless of the section of the test in which they appeared. Application-type items were found in the mid-term examination as follows: Part I—21 times, Part II—none, and in the final examination: Part I—27 items, Part II—7 items; and factual items were combined as follows in the mid-term: Part I—12 items, Part II—65 items; and in the final: Part I—33 items, Part II—67 items.

As shown in Table 2, the advantage accorded the experimental group on Part I of both mid-term and final examinations was maintained when only application-type items were considered. In like manner, the control group retained the advantage held for Part II of both tests when only factual-type items were included. However, the instructors of the experimental group constructed most of the application-type items and the factual items were supplied largely by the instructors of the control group. It is important to note that the experimental group outperformed

the control group on application-type items in the mid-term as well as the final examination. The former was administered only a week after the discussion method had been introduced, at a time when each group had attended approximately the same number of discussion sessions. It is not justifiable, therefore, to attribute the superiority of the experimental group in the respect in question to the conference method.

Test differences on the attitude inventory

When attitude responses on the objective scale were classified to identify the most "favorable" responses in each item, 19 of the 45 items were found to yield significant differences between experimental and control groups. The experimental group reported a more favorable attitude toward various aspects of the course than the control group on 17 of these 19 items.

To determine whether achievement in the course examinations was associated with attitude scores, the upper and lower 30 per cent within both the experimental and control groups were compared on total attitude score. No consistent relationship was found between course grade and the possession of favorable attitudes toward physiology in either group.

Certain items of the attitude inventory dealt specifically with the use of class discussion or the advantages of this method. Thus, approximately two-thirds (64 per cent) of the experimental group, compared to one-fifth (19 per cent) of the control group, declared that a good deal of original thinking was demanded of them, while more than four-fifths of the former group (83 per cent) as against one-half of the latter group (54 per cent) thought that the discussion method of teaching had increased their regard for a critical attitude towards research findings. Responses to items dealing with the conference method indicated that the experimental group attributed greater benefit to these discussions than did the control group. Slightly more than half of the experimental group favored devoting half or more of class time to discussion, as contrasted with but one-fourth of the control group.

On the other hand, both groups felt that the lectures were very worthwhile, four-fifths of the experimental and three-fourths of the control group thus reporting.

An effort was also made to summarize these 45 items in a single score. The five responses were arbitrarily weighted as favorable, neutral or undecided, and unfavorable by assigning values of +1, 0, and −1 respectively*. Application of these weights to student responses yielded a score for each student.

When the total attitude scores of the experimental and control groups were compared, as summarized in Table 3, the attitudes of the experimental group were found to be significantly more favorable than those of the control group.

Two years later when the attitude inventory was re-administered to the same two groups now in their junior year, both groups expressed a slightly more favorable attitude towards the various aspects of the course although the difference between experimental and control groups was maintained. (See Table 3) Analyses of the data also revealed a striking response-stability to individual items for both groups, with the following exceptions: both groups showed a much more favorable attitude to-

*Three of the 45 items were found to be impossible to classify in this manner and were omitted in scoring.

TABLE 3

Comparison of the Attitude Scores of the Control and Experimental Groups

Year	Group	Results N	M	S.D.
1952	Experimental	25	15.2	9.5
(as freshmen)	Control	81	6.1	10.3
	Difference		9.1**	
1954	Experimental	26	19.2	11.1
(as juniors)	Control	81	9.9	9.8
	Difference		9.3**	

** These differences are significant at the one per cent level.

wards course organization, examinations and demonstrations, and a much less favorable attitude toward correlation clinics. The follow-up study also indicated a greater appreciation of the value of the discussion method on the part of the control group.

Discussion

As previously stated, this teaching experiment was initiated as a pilot study rather than a definitive one. The features which recommend it from the point of view of scientific method are (a) the use of a control group, (b) the selection of an experimental group by random stratified sampling techniques, (c) the validation of the sampling procedures by means of a pre-test, (d) the objective evaluation of outcome both before and after operation of the most important variable it was intended to study, and (e) a follow-up study to evaluate the permanence of attitudes as measured by an attitude inventory.

The design can be criticized for at least the following reasons: (a) the treatment of the two groups was by no means independent. For example, the two groups received 12 lectures in common; they had access to each other's notes; and they each had both attended lectures and participated in conferences, etc. (b) The instructor factor was not the same for the two groups. In particular, they had different instructors and the instructor-student ratio was different. Moreover, the instructors of the experimental group were undoubtedly more strongly motivated since they were responsible for initiation of the project. (c) The class size was different for the two groups. (d) The reaction of students to the experimental situation was not controlled, i.e., whether being placed arbitrarily in an experimental or control group influenced student motivation or attitudes. (e) The validity of the measuring instruments was assumed.

Because of these defects in experimental design, the conclusions which can be drawn from the data are limited. This report serves to emphasize

the difficulty of obtaining the kind of information about teaching methods in medical schools which might profitably supplement the generally employed intuition of teachers and administrators.

REFERENCES

1. Davis, F. B.: "Item-Analysis Data," *Harvard Education Papers*, No. 2, 42, 1946.

2. Hoyt, C. J.: "Test Reliability Obtained by Analysis of Variance," *Psychometrika*, Vol. 6:153-60, 1941.

Comparación de los métodos de Conferencia y Discusión en la enseñanza de la Fisiología.

Para tratar de evaluar las ventajas e inconvenientes respectivos de las clases de tipo conferencia *(lecture)* y tipo discusión *(conference)* en la enseñanza de la Fisiología para los estudiantes de Medicina, se llevó a cabo en 1952, en la Universidad de Minnesota, el experimento siguiente: Estudiantes de Medicina, principiantes en Fisiología, fueron divididos en dos grupos: un grupo *experimental* (28 estudiantes) y un grupo *de control* (81 estudiantes). Los estudiantes de los dos grupos poseían similares conocimientos, lo cual fué establecido por medio de unos previos exámenes especiales. El trabajo en el grupo *experimental* se diferenciaba del trabajo en el grupo *de control*, principalmente, por haberse substituído en el primero más de la tercera parte de las clases de conferencia (35 horas de un total de 95) por sesiones dedicadas casi exclusivamente a la discusión de trabajos publicados en el campo de la Fisiología experimental. Dos miembros de la Facultad estaban encargados de la instrucción del grupo *experimental*, siete del grupo *de control*. Los dos grupos tenían en común doce clases de conferencia, así como el trabajo clínico y de laboratorio. Los resultados de estos dos métodos de ensenanza fueron evaluados por medio de dos exámenes (uno a la mitad y otro al fin del semestre) así como por un estudio de las actitudes de los estudiantes con respecto a la instrucción recibida (tal estudio se llevó a cabo una vez al final del curso y otra dos años después). Los exámenes fueron los mismos para los dos grupos, pero en ambas sesiones una parte de las pruebas fué preparada por los instructores de grupo *de control* y otra por los del grupo *experimental*. Los resultados totales de los exámenes fueron casi idénticos, pero cada grupo sobresalió en las partes preparadas por sus propios profesores. En cuanto a la actitud de los estudiantes frente a los dos métodos, resultó que los del grupo *experimental* expresaron una opinión considerablemente más favorable en cuanto a varios aspectos de su curso de Fisiología que los del grupo *de control*.

El experimento descrito no pudo ser muy conlusivo a causa de varios defectos en el procedimiento seguido, defectos que el autor del presente trabajo señala detalladamente.

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un minimum de 25 lectores.

Medical Education in the Middle Ages

OWSEI TEMKIN

Introduction

IN THE HISTORY of medical education,[1] the medieval period comprises, roughly speaking, the thousand years between 500 A.D. and 1500 A.D. These time limits are somewhat arbitrary for there are no decisive events that would mark a starting point or clearly defined end. In many, if not all, medical schools teaching in the medieval manner continued far into the 17th century. However, by about 500 A.D. some features marking medieval education had become pronounced, and after the year 1500 new departures had become sufficiently strong to permit discussion of the thousand-year span between these two dates as a separate unit.

The medieval period was by no means a static one. At its beginning we find the Western world in the process of barbarization by the invading Teutonic tribes. Together with the political division of the Roman Empire, the cultural ties between the Latin West and the Greek East also became very thin. True, various Greek medical classics were being translated around 500 A.D. into Latin, and at Ravenna in Italy an echo was even heard of the teaching of medicine as practiced in Alexandria.[2] But translations into the vernacular were, as in our own days, a sign of a waning knowledge of the original tongue. Moreover, the urban centers of the West gradually declined and the society of the countries north of the Alps became increasingly agrarian. As a result the lay medical profession disintegrated. Lay leeches existed in the early middle ages (i.e. before about 1000 A.D.) but of their education we know very little. A vigorous medical profession, interested in the organized training of its members, presupposes a relatively dense population with a sufficient number of potential patients. Thus it happened that, as in other fields of learning, monasteries became the repositories of the remnants of ancient medical literature which the monks passed on by copying the manuscripts. Dedicated to the idea of charity, they also took care of the sick, especially sick brethren. With the growth of the schools attached to monasteries and cathedrals, a certain interest in theoretical medical study was reawakened. These schools cultivated the liberal arts which comprised grammar, rhetoric, and dialectic (or logic) as the so-called *trivium*, and arithmetic, geometry, astronomy, and music as the so-called *quadrivium*. Strictly speaking, medicine fitted into none of these disciplines, but, if so desired, room could be found.[3] While at most of these schools some medicine was probably taught to clerics as well as interested laymen, anybody aspiring to more profound study had to attach himself to a teacher on an individual

Dr. Temkin is professor at the Institute of the History of Medicine, Johns Hopkins University.

basis. Such a teacher we find at Chartres in the person of one Heribrand, a pupil of Gerbert (later Pope Sylvester II, ab. 950-1003), the greatest Western scholar of his time. It was to Chartres that Richer, another pupil of Gerbert's, went upon the invitation of Heribrand to "read" with him the "Aphorisms" of Hippocrates.[4] Such reading represented the highest form of medical studies before the rise of Salerno and the impact of Arabic medicine in the 11th century.

Method of teaching

The "reading" of a classical medical text such as the "Aphorisms" of Hippocrates meant the interpretation of the text by the teacher who added his explanation to it. It was a method of theoretical study that had emerged in late antiquity and had found academic form in Alexandria around the beginning of our period. Ancient medical education was based on a master-apprentice relationship. Fundamentally it was practical. How much medical science and what kind of science the pupil learned depended on his preliminary education, on the quality of the teacher, and on the philosophical orientation of both. Only after the death of Galen (about 200 A.D.) and due to his increasing influence, were anatomy, physiology, and the search for the causes of disease generally recognized as mandatory medical subjects. Galen did not invent these sciences and after him anatomy and physiology were rarely pursued in his spirit, that is by dissection (of monkeys and other animals) and experiment. In these fields Galen's writings came to supplant Galen's own method. Medical study of the theoretical disciplines thus became increasingly a study of authoritative texts. In Alexandria, which for centuries had been the main center of Greek scientific activity, the professors arranged selections of works (particularly Galen's), suitable for physicians and advanced students. They expounded these works in commentaries and thus laid the foundation of a uniform medical system which was concentrated, self-consistent and easily imparted. The activity of these professors did not remain limited to Alexandria but spread to the near Orient. This spread was helped by the adherents of various Christian sects, especially the Monophysites and Nestorians. The latter, having been driven from the Byzantine realm, found refuge among the Persians where they established schools and centers of learned activities. Of these, Gundéshapur became of great importance as a transmitter of Greek medicine to Syrians and Arabs. And it was through Arabic medical works that, from the 11th century on, the West regained possession of a fuller measure of ancient medicine.

The medical doctrine that was imparted to the students in Alexandria around 500 A.D. and that remained basically the same throughout the middle ages rested on the assumption that the elementary bodies, namely, earth, water, fire and air, are characterized by combinations of the qualities hot, cold, dry and wet. The tissues of the body as well as its humors (of which blood, phlegm, black bile and yellow bile were the main types) also represented mixtures of these qualities, balanced in health, disproportioned in disease. Diagnosis of a disease, therefore, meant a recognition of the humors and qualities prevailing in the individual case, while therapy was directed at reestablishing harmony. This doctrine was greatly elaborated, often in a manner which strikes the modern reader as being unbearably dull since

original observations were hardly ever included. Moreover, the teachers varied but little in their interpretations, the lecture notes of Alexandrian professors which have been transmitted to us are very similar even if they go under different names. The preoccupation with logical and verbal *minutiae* can partly be explained by the fact that not all the students of the Alexandrian medical professors were future practitioners. There were to be found among them theologians and others who wished to learn something about the structure and function of the human body. Their presence probably strengthened the already existing tendency to bring medicine into a close relation with philosophy, especially that of Aristotle. This connection became very strong in subsequent centuries, especially among the Arabs. The Arabic word *hakim* denotes both philosopher and physician, and many of the great Arabic physicians, like Avicenna (died 1037) and Averroës (died 1198), are great names in the history of philosophy too.

But if Alexandria bequeathed to medieval medicine a tradition of bookish education, it also imparted to it the principle of orderly study. In the beginning of his lecture, the instructor would raise the question as to the *ordo legendi*, that is the position of the particular book within the framework of other titles. Moreover, in their selections of Galenic books suitable for beginners, the professors even dared to choose an order different from that recommended by Galen. In short, we have here the beginning of a graded curriculum, a principle that was followed by the medieval universities.[5]

Changes in the latter years

Three events combined to shape the form of Western medical education during the later part of the middle ages: the rise of urban centers, translations of classical and Arabic medical authors into Latin, and the organization of universities. In contrast to the monastic tradition of the early middle ages, medicine was being taught by laymen in Salerno which reached the pinnacle of its fame after new translations made by Constantinus of Africa, who ended his days in the monastery of Monte Cassino in 1087 A.D., had become available. In Salerno, as in Montpellier and Paris which were to come into eminence somewhat later, teaching was at first in the hands of individual physicians bound loosely, if at all, by any organizational ties.[6] The references to Salerno in the literature of the 12th century leave no doubt that medicine and surgery could here be learned theoretically as well as practically. If we are to believe John of Salisbury (died 1180), physicians were turned out quickly in Salerno (and Montpellier). Speaking of students who had recognized their philosophical shortcomings, he says that "they went to Salerno or Montpellier and became the followers of the physicians and of a sudden and with dispatch they burst forth as the same kind of medical men as they formerly had been philosophers. Stuffed with fallacious experiences they soon return, practicing zealously what they have learned. They boast of Hippocrates or Galen, utter unusual words, constantly quote their aphorisms, and shatter human minds with their unheard of names, as if a thunderstorm had struck them."[7] This statement relates to the 12th century when Salerno had not yet acquired the status of a university.[8] It is in contrast to the later ordinances of Frederick II which reveal a pattern of medical education simi-

lar in outline to ours. In the first place, the study of medicine had to be preceded by a three-year premedical course devoted to the study of logic which, to the medieval mind, represented the true scientific method. The actual medical curriculum lasted five years and consisted mainly in the reading of the works of Hippocrates and Galen. The student had to obtain a testimonial from his teachers as to the success of his studies. But he was not admitted to medical practice before having followed his teacher on his professional visits for one year. Moreover, surgery was declared a part of medicine; it included dissection of animals, and future surgeons were specifically directed to attend this branch of medicine. The actual admission to practice was dependent upon the obtaining of a license by the government.[9]

The realm of Emperor Frederick II, in which Salerno and Naples were situated, has often been called the forerunner of a modern state. While his and his predecessor's statutes regulating medical education have no exact parallel in other universities, some features common to all can yet be discerned. A study of liberal arts was a prerequisite for admission to the study of medicine. From the 13th century on, when the biological works of Aristotle began to play a great role in the arts faculties, the connection between the two became very close. This is especially true of Italy[10] with its strong lay spirit where, as has been claimed, "the study of art was completely subordinate" to medicine.[11] The old and close connection between natural philosophy and medicine is still remembered in the word "physician." Originally connoting the natural philosopher, *physicus* gradually began to be used also as a designation for the medical man.[12]

In its outlines, the education of a physician in the later middle ages would take the following course. At first he would be initiated into reading, writing, and the elements of Latin. These elementary studies could be taken under private tutors or at a school connected either with a religious institution or established by the city. His elementary education completed, the boy at the age of 15 or 16 would then go to a *studium generale*, that is a university to become matriculated in the arts faculty.[13] After about six years,[14] these studies were to lead him to the degree of magister (master), and then he was qualified to enter the medical faculty. Here he was a mere student until he acquired the degree of bachelor of medicine. The position of a bachelor was peculiar in as far as he was partly student, partly teacher. The student "heard" *(audire)* books, the teacher "read" *(legere)* them. The basic textbook was the so-called "ars medicinae" *(Articella)*. In its later printed editions it usually comprised: the *Isagoge* by Joannitius (i.e. the Syrian-Arabic physician Hunain ibn Ishaq of the ninth century), a very brief and concentrated introduction into the current Galenic system;[15] the *Ars parva (techne iatrike)* the medieval title given to one of the books in which Galen outlined medicine as a whole; two short treatises on pulse and urine ascribed to Philaretus and Theophilus respectively; and several Hipprocratic works ("Aphorisms", "Prognostics", "Regimen in Acute Diseases", "the Sixth Book of the Epidemics", "On the Nature of the Fetus", "The Law and the Oath"). The "Articella" was of course supplemented by other texts, mainly of Arabic authors. Apart from attending lectures, the student also had to respond to questions, participate in dis-

putations, and uphold theses before he was admitted to the examination for the licentiate, which ended his status as a student. He had now fulfilled the conditions for becoming a magister or doctor, and therewith a full fledged member of the faculty. Originally the two designations were equivalent, but gradually the Italian preference for the designation of "doctor" prevailed. At first this implied the right—or even duty—to teach, but in course of time the professors were selected from among the doctors so that the degree did not necessarily connote a teaching function.[16] The doctoral promotion was a very solemn (and expensive) act since it elevated the candidate to a high social rank, quite apart from giving him the right to practice medicine. Students and bachelors did not possess this right, although in many places they were allowed, or even expected, to attend the visits of their teachers in hospitals and private practice. For instance, at Caen it was stipulated in 1439 by the medical faculty that a bachelor "shall be required to practice at Caen for two summers with a master, not however of himself administering any medicine, digestive, laxative or comforting, nor visiting the sick at all except the first time, unless by special license of some master."[17]

The right of practice by law or *de facto* was usually restricted to the university's sphere of influence. In other cities, university or medical college would make the holder of a foreign degree comply with their rules before incorporating him.[18] And where neither university nor college could make its power felt, medical practice was all but free, and a bachelor's degree very often sufficed to give scientific recognition to its bearer.

Although medicine was divided into "theoretical" and "practical," and separate chairs established for the two, the division related to subjects rather than a mode of teaching. If the chair of practical medicine was given to an experienced practitioner, the student had the advantage of hearing something about actual conditions beyond the traditional matter treated in the scholastic texts.[19] If, moreover, he was allowed or even expected to follow his teacher on the latter's professional visits, he could be initiated into the practice of medicine. But even if required, bedside instruction remained extra-mural until the 16th century when clinical instruction was instituted at Padua. Within the academic walls the emphasis lay on book learning, in spite of the occasional use of illustrations and even of anatomical dissection. While Salernitan anatomy was based on animals, Mundinus in Bologna had two human cadavers dissected in 1315, from which year we date the beginning of the institution of public anatomies, that is the dissection of a human cadaver for anatomical demonstration and teaching. However, the didactic value of this procedure was not very considerable. Mundinus himself wrote a short text which became widely used on these occasions. The professor would read it aloud, while a surgeon or barber would perform the dissecting, and a third person demonstrate the organs. Outside of Italy, at least, these public anatomies were performed at intervals of years and the separation between teacher and prosector survived into modern times. In Italy, however, we find professors of surgery performing dissections even before Vesalius.[20] In Italy the academic connection between medicine and surgery had never been disrupted. But elsewhere, medicine and surgery became separated and with this separation there

developed two different types of medical education.

Distinctions between medicine and surgery

In one of the many medieval classifications of the sciences, written shortly after 1200 A.D., "medicine" appears as a sub-division of "natural science" *(physica)*, whereas surgery is classified with the "mechanical sciences," together with wool-working, agriculture, etc.[21] Translated, as far as this is at all possible, into modern terminology, it means that medicine was a basic science while surgery belonged to the realm of technology. But the distinction did not imply that the physician renounced the theoretical side of surgery. He considered himself qualified to direct the surgeon if the latter was a mere craftsman. "At any rate," wrote Guy de Chauliac (died 1368), the most renowned of all medieval surgical authors, "the truth is that there are two surgeries: one which teaches and to which the name of science properly belongs, and this can be grasped by one who has never worked at it. The other is practical or consists in practice, and to this the name of art properly belongs, and nobody can understand it who has not seen it exercised; and this is numbered among the mechanical arts by Aristotle."[22] Surgery as a mechanical art in the above sense needed a different educational system, a system that was connected with the development of urban communities around 1000 A.D. By 1200 A.D. many cities had attained great power and wealth which rested largely on the craftsmen or at least on the masters of certain guilds. Inside the town it was no mark of inferiority to work with one's hands. To the lay practitioner, the leech, the city offered not only safety, but also a relatively large clientele and a spiritual climate that allowed him to take pride in his work. The existence of a separate surgical profession after 1200 is established by such documents as the contract of 1214 between Hugh of Lucca and the city of Bologna.

In 1311, King Philip the Fair, reinforcing an earlier law, demanded an examination of those practicing surgery in Paris by the sworn master surgeons. Moreover, he prescribed that the license to practice should be given by the surgeon at the royal castle. About half a century later, in 1360, mention is made of the fraternity of St. Cosmos and Damian as a licensing body, and this is the first document about this famous guild of surgeons which is definitely dated. About the same time we also find the surgeons divided into masters, licentiates and bachelors. This was an imitation of the degrees given by the university, and the statutes make it clear that those wishing to become bachelors or licentiates had to pass examinations. But in spite of all the academic formality, the teaching was of course based on the apprenticeship system, though a certain educational standard was set by a statute ascribed to 1396 requiring "that no master or bachelor take on any apprentices if they are not schooled in grammar to write and speak good Latin, for otherwise the science of surgery might come to naught."[23]

In contrast to the cosmopolitan form of medical education at the universities, that of the surgeons differed widely. In Italy, surgery was not entirely separated from the universities;[24] in France too and even elsewhere there existed in the thirteenth and fourteenth centuries surgeons who were in full possession of the academic education of their time, "clerc surgeons" who even wrote

their works in Latin. At the other extreme there emerged a class of low surgeons who ranked with barbers and bath attendants. They too formed guilds, but apart from their manual training possessed little formal education. The public itself may have helped the rise of the barber-surgeons, since even princes and prelates thought that a surgeon should not be a clerk, that is a scholar, "because during the time the clerc visits the schools, the layman learns the method of manual operations."[25] Outside of Italy the 16th century witnessed the triumph of the barber-surgeons over the clerk-surgeons, as attested by the establishment of the United Company of Barber-Surgeons in England under Henry VIII, and the reform of surgery by the French barber-surgeon, Ambroise Paré (1510-1590), who commanded his mother tongue only.

In developing the two systems of education, with emphasis on learning in one and stress on practical training in the other, medieval medicine is responsible for a cleavage that survived far into modern times. On the European continent the academic tradition prevailed. In England, Oxford and Cambridge had to compromise with the apprenticeship system of surgeons and apothecaries which system also became the natural way of bringing up medical men in colonial America. Accustomed as we are to consider the laboratory and bedside as the training ground in medicine, we tend to condemn the medieval schoolmen as impractical. The unrealistic nature of some of the apparently practical subjects all but enhances this tendency. The medieval student, by verbal description and the help of illustrations, was taught how to interpret diseases by feeling the pulse and inspecting the urine. But in part at least, the traditional pulse-lore as well as urinoscopy rested on fantastic distinctions, let alone the intrusion of astrological ideas. How was it possible that for centuries men failed to recognize the futility of such schooling and did not realize the need for practical instruction? Before we try to give a tentative answer to this question it may be good to point out that the medieval doctor was not an unworldly man,[26] certainly not where his self-interest was concerned. Some instructions regarding prudent "public relations" between the doctor and his clientele would certainly be condemned as unethical today. They reveal an almost cynical attitude, but also much practical sense. A medieval author, who may be identical with the great Arnald of Villanova (died 1311), teaches that "when you come to a patient you should always do something new lest they say that you cannot do anything without the books."[27] And the same writer gives the following instruction:

"Entering the sickroom do not appear very haughty or over-zealous, and return, with the simple gesture, the greetings of those who rise to greet you. After they have seated themselves you finally sit down facing the sick; ask him how he feels and reach out for his arm, and all that we shall say is necessary so that through your entire behavior you obtain the favor of the people who are around the sick. And because the trip to the patient has sharpened your sensitivity, and the sick rejoices at your coming or because he has already become stingy and has various thoughts about the fee, therefore by your fault as well as his the pulse is affected, is different and impetuous from the motion of the spirits."[28]

How then is it possible that so coolly realistic people adopted the scholastic way of medical education? The following passage from a well-known

pharmacological text of about 1200 gives us a clue. The author admonishes his readers to read the approved books and choose the useful ones. "The multitude of books and the confusion of experiences distract us."[29] One aim of medieval education was the training of the future doctor in a tradition that had stood the test of centuries. There was no lack of "empirics," men and women alike. What methods were there available to the medieval doctor for sifting the grain from the chaff in the allegedly effective treatments? Adherence to tradition was one way of screening, even though we can think of better ways. To this must be added a further consideration. The medical faculties had a relatively small number of both teachers and pupils.[30] A country like Germany had no university at all prior to 1348. Moreover, at the time of his promotion the doctor of medicine, as we have seen, had reached about the same age as a modern medical graduate. But the social significance of more than 25 years largely devoted to study was different in an era of low life expectancy and great physical insecurity from what it is now. The medieval doctor of medicine must not be compared with the modern practitioner. He was a member of an élite that was in possession of the theoretical knowledge the time possessed. Although illiteracy was declining after the 12th century,[31] the Latin scientific literature was still sufficiently limited to elevate the scholar above the many who possessed some practical skill. If we are willing to see medieval medical education within the possibilities of its time, we can do it more justice than if we arbitrarily compare it with achievements of later periods. The attacks of radical reformers such as Paracelsus (1493-1541), are instructive by contrast. When Paracelsus in 1527 issued his proclamation to the students of Basel, he promised to purge medicine of its errors "not by following the precepts of the Ancients, but those which partly nature, partly our own inventiveness have shown us and which we have verified by long use and experience." This appeal of a new time came when the source of progress through a better acquaintance with ancient literature was all but exhausted, many of the classical works having become available by then. Besides, it took more than a century till "observation of nature" could be translated from an anarchic intuitional subjectivism into an objective science. The very fact that the medieval system of medical education survived far into the seventeenth century shows that it possessed some merits of its own, apart from having bequeathed to us a graded curriculum, examinations, degrees, and licensure.

REFERENCES

1. In spite of some inadequacies in the light of more recent research, THEODOR PUSCHMANN's "A History of Medical Education from the Most Remote to the Most Recent Times" (translated and edited by Evan H. Hare, London, 1891) is still the standard work for the period under discussion and should be consulted for additional details.

2. OWSEI TEMKIN: "Studies on Late Alexandrian Medicine, I", *Bull. Hist. Med.* 1935, *3:* 405-430; *see* p. 408.

3. LOREN C. MACKINNEY: "Early Medieval Medicine, with Special Reference to France and Chartres," Baltimore, Johns Hopkins Press, 1937; *see* pp. 95, 121, 187.

4. *Ibid*, p. 122.

5. For Alexandria *see* Temkin, *op. cit.* (note 2).

6. For Salerno *see* PAUL OSKAR KRISTELLER; "The School of Salerno," *Bull. Hist. Med.* 1945, *17:* 138-194; for Paris: STEPHEN D'IRSAY, "On the Original Connection Between Medicine and the University," *Bull. Johns Hopkins Hosp.* 1930, *46:* 117-122, (*see* p. 121); for Montpellier: SONOMA COOPER: "The Medical School of Montpellier in the Fourteenth

Century," *Annals of Medical History*, 1930, n.s. 2: 164-195 (see p. 166 f.).

7. "Joannis Saresberiensis Episcopi Carnotensis Metalogicon Libri IIII," Ed. CLEMENS, C. I. WEBB, Oxford Clarendon, 1929, p. 13, 5 ff. (book I, ch. 4).

8. For a detailed discussion of the history of the internal and external development of Salerno *see* KRISTELLER, *op. cit.* (note 6).

9. The ordinances of Frederick II have been translated into English by EDWARD F. HARTUNG: "Medical Regulations of Frederick the second of Hohenstaufen," *Medical Life*, N.S., 1934, *41:* 587-601.

10. HASTINGS RASHDALL: "The Universities of Europe in the Middle Ages," New edition by F. M. Powicke and A. B. Emden, 3 vols., Oxford, 1936; *see* vol. 1, p. 234.

11. *Ibid.* vol. 2, p. 59.

12. MacKinney, *op. cit.* (note 3), p. 131, and Kristeller, *op. cit.* (note 6), p. 159.

13. RUDOLF LIMMER: "Bildungszustände und Bildungsideen des 13. Jahrhunderts", Diss. Munich, Munic, Oldenbourg, 1928; *see* p. 176.

14. *Ibid.* p. 177.

15. For English translations of the Isagoge see EDWARD THEODORE WITHINGTON, "Medical History from the Earliest Times," London, Scientific Press, 1894, pp. 386-396; and H. P. CHOLMELEY: "John of Gaddesden and the Rosa Medicinae", Oxford, Clarendon, 1912, pp. 136-166.

16. Puschmann, *op. cit.* (note 1), p. 262 ff.

17. LYNN THORNDIKE: "University Records and Life in the Middle Ages", New York, Columbia University Press, 1944, p. 322.

18. As Puschmann, *op. cit.* (note 1), p. 265, points out, limitations put on holders of foreign degrees related to their membership in the faculty rather than the right to practice.

19. Thorndike, *op. cit.* (note 17), p. 374, gives an example of a sixteenth century student who preferred the experienced practitioner among the "professors of Practice."

20. As CHARLES SINGER and C. RABIN: "A Prelude to Modern Science", Cambridge University Press, 1946, p. xxxii, point out in the case of Berengario da Carpi, it is not always possible to draw the line between autopsies and "anatomisations."

21. MARTIN GRABMANN: "Die Geschichte der scholastischen Methode", 2 vols., Freiburg im Breisgau, Herder, 1909-1911; vol. 2, p. 52.

22. E. NICAISE (editor): "La grande chirurgie de Guy de Chauliac", Paris, Alcan, 1890, p. 7.

23. E. NICAISE (editor): "Chirurgie de maitre Henri de Mondeville", Paris, Alcan, 1893, p. lxxiv. The above paragraph is based on the material presented by Nicaise in his introduction.

24. *See* above, p. 387.

25. JULIUS PAGEL (editor): "Die Chirurgie des Heinrich von Mondeville (Hermondaville), nach Berliner, Erfurter und Pariser Codices," Berlin, 1892, p. 68.

26. LOREN C. MACKINNEY: "Medical Ethics and Etiquette in the Early Middle Ages: the Persistence of Hippocratic Ideals." *Bull. Hist. Med.* 1952, *26:* 1-31, on p. 29 writes: "Perhaps the chief surprise that comes to the student of early Medieval medical manuscripts is the rarity of instances of that pious otherworldly spirit which is supposed to have hung like a cloud over the Middle Ages."

27. HENRY E. SIGERIST: "Bedside Manners in the Middle Ages," *Quarterly Bull. Northwestern Univ. Med. School*, 1946, *20:* 136-143; *see* p. 140.

28. *Ibid.* p. 141.

29. Aegidius Corbeilensis, "Liber de virtute et laudibus compositorium medicaminum metrice compositus," quoted after Limmer, *op. cit.* (note 13), p. 248.

30. MAX NEUBERGER: "Geschichte der Medizin," 2 vols., Stuttgart, Enke, 1906-1911; *see* vol. 2, p. 465.

31. JAMES WESTFALL THOMPSON: "The Literacy of the Laity in the Middle Ages" Berkeley, University of California Press, 1939, *passim*.

La Educación Médica en la Edad Media.

En el período medioeval (500-1500 de la era cristiana, aproximadamente) los estudios de Medicina sufrieron notables cambios. Con la división del Imperio Romano, los vínculos culturales entre el Occidente, latino, y el Oriente, griego, se fueron debilitando, aunque aun en el siglo XVI varios libros griegos de Medicina se tradujeran al latín. Debido a la decadencia de los centros urbanos y a la creciente ruralización de los países situados al norte de los Alpes, el médico laico fué desapareciendo, y fueron los monasterios los que se convirtieron en centros tanto de estudios médicos como de

práctica de la Medicina, ya que el cuidado de los enfermos era un aspecto importante de las obras de caridad de los monjes. Mas aunque en las escuelas anexas a monasterios e iglesias se enseñara a ciertos clérigos y a unos pocos legos algo de Medicina, ésta se hallaba fuera de las Disciplinas medioevales tradicionales, y por tanto, quien aspiraba a poseer conocimientos más profundos tenía que buscar a algún maestro privado (el más famoso fué Heribrando de Chartres, en el siglo X). La forma más elevada de los estudios de Medicina consistía, en aquella época temprana, en la lectura de los textos antiguos de Medicine, principalmente los de Hipócrates, y en su interpretación por el maestro. De Alejandría, que durante siglos había sido el centro de los estudios basados en la autoridad de los textos, llegó al Occidente, a partir del siglo XI, a través de los escritos árabes de Medicina, la doctrina médica clásica de los "humores" (basada en la teoría de los cuatro elementos) que determinaba Diagnosis y Terapia; y también de Alejandría se transmitió el principio de un *curriculum* de estudios, que fué seguido después por las Universidades Medioevales.

Más avanzada la Edad Media, tres factores determinaron la educación médica occidental: el desarrollo de los centros urbanos; las traducciones al latín de textos medicinales de autores clásicos y árabes, y la organización de las Universidades. La enseñanza y la práctica de la Medicina se secularizaron de nuevo. En el siglo XII, los centros médicos fueron Salerno, Montpellier y París. Un curso de Medicina, en esas Universidades (precedido de un curso de tres años de Lógica) consistía principalmente en el estudio de las obras de Hipócrates, pero ningún estudiante era admitido a la práctica médica sin antes haber acompañado a su maestro durante un año en sus visitas profesionales. En Italia, la Cirujía formaba parte de la Medicina e incluía la disección de animales (la primera disección de cadáveres humanos fué llevada a cabo por Mundino en Bolonia, en 1315, siendo ésta el principio de la "anatomía pública") Una licencia del Gobierno era requisito para el ejercicio de la Medicina. Desde el siglo XIII, con la creciente influencia de las obras biológicas de Aristóteles en las Artes liberales, la relación entre éstas y las ciencias médicas se hizo muy estrecha, sobre todo en Italia. El estudio de la Medicinia se iniciaba, a la edad de 15 años, con el *studium generale* (seis años de estudio de las Artes liberales). Obtenido con ese estudio el título de *magister* (maestro) en Artes, el estudiante quedaba calificado para entrar a la Facultad de Medicina. Allí, después de obtener el título de *bachiller*, seguía sus estudios para el grado de doctor. El texto básico era el *Ars Medicinae (Articella)*, introducción al sistema de Galeno, suplementado con algunos textos árabes, el *Ars parva* y dos tratados cortos sobre el pulso y la orina. Aparte de asistir a las conferencias, el estudiante tenía que responder a preguntas que le hicieran, participar en disputas y sostener una tesis que le confería el título de *magister* o doctor (este último título fué el que prevaleció con el curso del tiempo), lo cual le elevaba, además, a un rango social distinguido. Una de las diferencias fundamentales entre la educación medioeval y la de hoy es la separación radical que entonces se hacía de la "Medicina" (que formaba parte de las ciencias naturales) y de la "Cirujía" clasificada ésta entre las artes mecánicas y considerada como inferior a la primera. Tal distinctión sobrevivió largo tiempo, aun en el período moderno (excepto en Italia, donde hubo siempre una estrecha relación entre Medicina y Cirujía). Los conceptos medioevales en cuanto a la Medicina y a la educación médica, y con ello una particular ética profesional, prevalecieron en el Occidente hasta el siglo XVI. Aun después de los ataques que a esos conceptos hicieran reformadores radicales tales como Paracelso (cuya proclama ante los estudiantes de Basilea, en 1527, constituye un acontecimiento muy importante en el desarrollo de la educación médica) fué preciso más de un siglo para que la Medicina y la educación médica pudieran liberarse completamente de la servidumbre de textos y preceptos antiguos y se convirtieran en ciencia objetiva.

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un mínimum de 25 lectores.

Medical Education in Japan

YOSHIO KUSAMA

Introduction

UP TO THE period preceding World War II there were 28 medical schools in Japan. Eighteen were of university level with relatively high standards, entry to which required 14 years of education—six years in primary, five years in middle and three years in the science section of a higher school or a university preparatory school. The medical school offered a 4 year course of studies leading to a degree equivalent to doctor of medicine. On the basis of having a diploma of graduation, a license to practice was given without any further examination.

The remaining medical schools were at lower technical colleges called "Semmon Gakko." Although this type of school consisted of a four year course, students were admitted directly from middle school after completing only 11 years of education. To compensate for the lack of proper training in basic knowledge of natural sciences, makeshift courses in physics, chemistry, biology and mathematics were crowded into the medical curriculum of four years with the sacrifice of proper medical training. Graduates from these "Semmon Gakko" received the same license and had the same rights and privileges as the graduates from the university medical schools. It was obvious that their training was of inferior quality. During World War II the number of "Semmon Gakko" medical schools was increased to a total of 51 in order to meet the military demand for more doctors. The number of students in each class was also increased two or even three fold over the facilities offered by the schools for proper training.

At the close of the war medical education was found in the most confusing and lamentable state of affairs. There were altogether 69 medical schools, 18 university level and 51 "Semmon Gakko" type. Classes were overcrowded with students, who had no textbooks and who lacked the essential instruments that medical students are usually provided with for their laboratory and clinical work. Teaching was conducted in class rooms, and laboratory and clinical work was reduced to a minimum due to the loss of equipment and facilities and overcrowding. The four year medical course was cut down to three and a half years and a reduction to three years was even contemplated. Over 8,000 students were finishing their improvised medical training annually when the war came to the end.

Reorganization of medical education

In March 1946, the Council of Medical Education was organized with nine members—six selected among the leaders of medical education in the universities, equally representing the government and private institutes, one each repre-

Dr. Kusama is professor of preventive medicine at Keio university and chairman of the Council on Medical Education in Japan.

senting the Ministries of Education, Health and Welfare, and the Japan Medical Association. The representation of the ministries on the council was very significant. Any measure recommended by the council was readily transmitted to the administrative ministries concerned and executed effectively and promptly. This arrangement was regarded as one of the factors by which reorganization of medical education and the practice of medicine was achieved so successfully in so short a time.

The first task of the council was to draw up broad principles of medical training in Japan. The four year course of medical education was immediately restored. Medical education was raised to the university level with a minimum of two years of premedical preparation in a university, and the "Semmon Gakko" type was closed for new students. A minimum standard of medical school was carefully drawn up with provisions for qualifications of the teaching staff, adequate laboratory and clinical facilities for proper teaching, and research work. A great deal of thought was spent in drawing up new standards for the curriculum.

Rotating internship was made a prerequisite in order to qualify for the national examinations. This was done for the first time in the history of medical training in Japan. Passage of the national examinations for licensure was made requisite for qualified persons to practice medicine in this country. Some of these drastic changes were put in force immediately without giving due interim time for adjustments, creating many hardships on the part of the upper class students, who had to comply with the unexpected prolongation of their training and take licensure examinations. Strong protests against the measures or appeals for postponement until better economic stabilization was regained poured in, not only from the student circles, but also from other quarters. Although some minor revisions were made from time to time in order to adjust more realistically some of the measures to the circumstances, no basic principles have been altered up to the present time.

The most perplexing problem confronted in the attempt to reorganize medical education was the disposition of some of the medical schools. There were 69 in existence then, 18 university level and 51 lower level schools. The former had relatively high standards, comparable to any high standard medical school in the western world, and were left untouched. The latter type had to be raised to university level, but there were too many. The processes of elimination and the elevation of the schools which were permitted to continue were not very easy and simple. These schools which were permitted to continue were not members of the Board of Medical School Inspection of the Ministry of Education, which was created by a recommendation of the Council of Medical Education. Five, which are far below acceptable standards, were closed at once and the students transferred elsewhere. Eighteen which were attached to universities which already had a university level medical school were allowed to continue until the students already entered had graduated. Thus 23 "Semmon Gakko" medical schools were readily disposed of without undue difficulties.

The remaining 28 "Semmon Gakko" medical schools were placed on probation for three years until they could attain a university level of teaching with qualified teaching staff and adequate laboratory and clinical

facilities. No new students were allowed until a new charter was obtained. All had done so by July 1950. An extra year was prescribed for all students in "Semmon Gakko" schools to help make up for their lack in premedical studies, and the last class of this type of schools was graduated in March 1952. These 28 newly raised university level schools together with the 18 university schools already in existence make up the total of 46 medical schools in Japan.

Administratively, out of the 46 medical schools, 20 are government supported schools, their faculties constituting a part of the national universities. The government is taking energetic steps in carrying out a program of reconstruction of buildings and furnishings facilities for adequate training of medical students. There are 13 medical schools supported by local governments, namely provincial and municipal. Some of the schools of this type are more or less poorly supported, and consequently they are struggling hard to keep up the standard requirements.

The remaining 13 schools are private institutions. Practically all of them have no permanent endowment or foundation to support maintenance of the school. It may be difficult to understand from the western standard how a private medical school can be maintained without outside supports. They are self-supporting. The important sources of income are hospitals operated under direct control of the medical school. The medical services are paid directly by the patients or charged to the social service offices. Since two-thirds of the people in this country are covered by the social insurances, a greater proportion of the patients pay only a minimum of surcharges, and practically no free patients are found. The less important sources are students' tuition and fees, and to some extent, donations of alumni and friends of the school for particular purposes, such as construction of laboratory buildings or purchases of expensive equipment and instruments. The government does not support these private schools directly, but indirectly by exempting them from taxation of any form. Some of the private medical schools maintain very high standards. All medical schools in Japan are maintained on non-sectarian basis. A student of any religious faith is accorded equal opportunity.

Premedical preparations and requirements

Premedical preparation requires a minimum of two years in a four year course of a university. There are certain prescribed courses and number of units which one must take. They are 12 units each in humanities and social sciences, 20 units of natural sciences including biology, physics, and chemistry, with laboratory work in each, mathematics, 16 units in English and German or French, 4 units of physical sciences including theories and practices. A total of 64 units is the minimum and must be taken by one to be eligible for entrance examinations for medical school. Recently the law concerning medical school was revised permiting a medical school to integrate two years of premedical course in its curriculum, thus making a total of six years, the requirements in premedical studies remaining the same.

Entrance examinations

The entrance examinations are conducted by individual schools, extending from the last three or four

days in March to the first part of April, since the academic year begins in April. They consist of reviews of the scholastic records of preparatory courses and high school, personal interviews, written examinations on the subjects taken in the preparatory courses and physical examinations. Competition is very keen, for the number of applicants always exceeds the number admitted by 3 to 10 times. It is higher in better schools. The students in Japan appear to be very selective as to which school they wish to enter. Many students apply to only one particular school of their choice, and if not accepted they usually wait until the next year for trial. The majority, however, have their school of second choice but rarely third choice, though there is no limitation as to the number of schools to which one may apply for examination.

The number of students in medical school

Beginning in 1950 the size of entering classes in the medical school was limited in accordance with the facilities for adequate training of medical students. Nineteen schools (13 national, 2 prefectural and 4 private schools) were permitted a maximum of 80 students, 11 a maximum of 60 students, while 16 were allowed only 40 students per class. Thus in the future a total of approximately 3,000 medical graduates per year would be expected. This number of new doctors is estimated to be about adequate for replacement of doctors now in practice and for natural increased demands for new doctors. The number of physicians in Japan is about 85,000—a ratio of one per 1,000 population. Thus the limitation of the number of students counterbalances with rather too large a number of medical schools. Women students are admitted to any medical school on equal basis as men, though there is one medical school of the 40, which has class for women only. Five per cent of each class is reserved for qualified foreign students of any nationality outside of the quota.

Content of curriculum

The standard curriculum of the Ministry of Education for the medical course is fairly closely observed by each medical school. The number of hours allocated to each subject is expressed by the percentages of the total hours in the four year course of the school. The school session usually extends or 33 to 34 weeks with 33 hours per week. A total of 4,400 hours is the average. The new academic year begins in April. The allocation of hours in percentages is as follows:

Subjects	*Percentage of hours*
Anatomy & histology	10
Physiology	6
Biochemistry	4
Pharmacology	4
Pathology	6
Bacteriology	4
Hygiene & public health	6
Medical zoology (parasitology)	2
Forensic medicine	2
Internal medicine	19
Psychiatry & neurology	2
Pediatrics	3
Surgery	9
Orthopedics	2
Dermatology & urology	3
Ophthalmology	2
Oto-Rhino-Laryngology	2
Radiology	2
Gynecology & Obstetrics	4
Electives	8

Attention may be called to the balances of hours allocated to the different subjects. The number of hours allocated to anatomy, for in-

stance, is greatly reduced from the customary program. Teaching of public health and preventive medicine is regarded as very important in the Japanese medical schools, for the future doctors in the country are expected to be thoroughly grounded in the theories and practice of public health so as to be able to render effective cooperation with the national public health services. Comparatively many hours are given to the teaching of internal medicine in contrast to surgery. It is thought that during clinical years the student should and could acquire a fairly good general diagnosis and therapeutic knowledge of diseases, whereas in surgery, the student is only expected to acquire basic knowledge in making correct diagnoses and evaluation of symptoms for surgical procedures.

Examination of graduates

Compulsory examinations are held, written or oral, at completion of each subject by the instructors concerned, usually toward the end of the academic term. In most of the schools two or three repeated examinations may be permitted in a case of failure, but all preclinical subjects must be cleared off before one can be advanced to the clinical years. For graduation one must register four academic years at least and pass all examinations on prescribed subjects satisfactorily. A degree equivalent to Doctor of Medicine is granted on graduation.

Tuitions and fees

Great differences are found in the amounts of student fees charged by the school according to differing administrations. Since the national schools are largely supported by the government, various fees charged to the student are very small. On the other hand the fees of the private schools are very high in comparison with the others, while that of prefectural schools are somewhat midway between the two. (Three hundred and sixty yen are equivalent to one American dollar).

1. National schools of medicine

Entrance examination fees	400 yen
Matriculation fees	400 yen
Annual tuition	6,000 yen
Laboratory fees may be charged on actual cost basis	

2. Prefectural schools of medicine

Entrance examination fees	500- 1,000
Matriculation fees	500- 2,000
Annual tuition	6,000-12,000
Laboratory fees	1,500- 5,000

3. Private schools of medicine

Entrance examination fees	3,000- 6,000
Matriculation fees	6,000-10,000
Annual tuition	20,000-35,000
Laboratory fees	5,000-10,000

Practical clinical training

Twelve months of rotating practical clinical training in an approved general hospital is required of all graduates as prerequisite to eligibility for the national licensure examinations. It is in nature an externship. When this training service was started in 1947, the number of new graduates was so large and hospital facilities were so bad that no internship service could have started then. As conditions are improving it is expected to have this service also improved. No stipend is paid for the service.

National licensure examinations

A license is required to practice medicine in this country as in all other countries. This licensure is a function of the Ministry of Health and Welfare to issue it to a qualified doctor. Qualification calls for graduation from a medical school in this country or recognized first class school in the other countries; in addition one year of internship; good moral character and passage of the national licensure examinations. The examinations are given twice a year in April and October, and consist of both written and oral examinations on clinical and preclinical subjects. A fee of 800 yen is charged.

La Educación médica en el Japón.

En el Japón la educación médica ha sufrido cambios notables en el período de la postguerra. Anteriormente, había 28 Escuelas de Medicina, de dos tipos: 18 de ellas tenían un nivel universitario relativamente alto. Se requería para la entrada que los estudiantes tuviesen un total de 14 años de educación previa (primaria, intermedia y secundaria); luego, con cuatro años de estudio se lograba la adquisición de un diploma equivalente al D.M. con el que se concedía también la licencia para practicar. Las otras 10 Escuelas llamadas "Semmon Gakko" eran de nivel inferior. Sólo se exigía de los estudiantes una educación escolar previa de 11 años, y la necesidad de suplir esa falta de conocimientos en las ciencias básicas con gran número de cursos breves de física, química, biología y matemáticas, redundaba en detrimento de la educación médica propiamente dicha. Los graduados de este tipo de Escuela recibían, después de haber cursado estudios de cuatro años, la misma licencia para practicar y tenían los mismos derechos y privilegios que los graduados de las escuelas del primer tipo, aunque su preparación era obviamente muy inferior. Durante la segunda Guerra Mundial, el número de las "Semmon Gakko" aumentó a 51 a fin de poder hacer frente a la gran demanda de doctores. Al terminarse la guerra, además de esas 51 del tipo "Semmon Gakko", había 18 del tipo universitario, formando un total de 69 Escuelas. En éstas, un número excesivo de estudiantes, carentes de libros de texto y de los instrumentos indispensables, se amontonaban en las clases, y así el trabajo clínico y de laboratorio quedaba reducido a un mínimo. Después de tres años y medio de improvisados estudios, 8.000 estudiantes de Medicina se hallaban a punto de terminar su carrera. Para hacer frente a esa grave situación, fué organizado en marzo de 1946 un Conse o de Educación Médica, con nueve miembros, representantes de las Universidades, del Gobierno y de la Asociación Médica del Japón. Su primera tarea fué establecer los principios generales de la educación médica en el Japón. Esta fué elevada a un nivel universitario, y las "Semmon Gakko" fueron cerrándose gradualmente. Mucho tiempo y cuidado se dedicó a establecer provisiones en cuanto a las calificaciones indispensables tanto para la Facultad como para los estudiantes, y en cuanto al *curriculum*, y, por primera vez en la historia del Japón, se determinó que la licencia para practicar sólo se podía adquirir después de un examen especial y después de haber cumplido con rigurosos requisitos de práctica de hospital. Algunos de estos drásticos cambios fueron llevados a cabo inmediatamente, lo cual, debido a la situación precaria del país en ese período, dió lugar a muchas dificultades y a protestas por parte de los estudiantes, hasta que se hicieron los ajustes necesarios. Mas a pesar de algunas revisiones indispensables, hasta el presente ninguno de los principios básicos establecidos por dicho Consejo han sido alterados.

Separatas de este artículo, en español, podrán obtenerse si son solicitadas por un mínimum de 25 lectores.

Medicine as a Social Science

F.A.E. CREW

Professor F. A. E. Crew has had an unusual career in medicine. Much of his life was spent as a geneticist and he occupied the chair of animal genetics at Edinburgh University from 1928-1944. During the last war he was Director of Army Medical Research, and he later edited the volume of the Official History of the 1939-45 War which dealt with the Army Medical Services. On leaving the Army he became professor of public health and social medicine at Edinburgh University. His scientific standing is shown by the fact that he is a Fellow of the Royal Society, a distinction that few medical men achieve. In view of his own career it is all the more interesting that his article shows him to be disquieted by the way in which medical education is entirely dominated by scientific disciplines and narrow specialism at the expense of care for the patient in relation to his total environment.

Sidney C. Truelove, Journal Correspondent
from the United Kingdom.

BECAUSE THERE IS in the general field of medical practice so wide a range of occupation it is exceedingly difficult, if not impossible, to describe in terms of attributes and acquisitions the ideal equipment of the medical graduate. This being so, it is difficult indeed to devise an educational machinery that can be expected to yield the desired product. Medicine implies action—disease preventive, health promotive, health restorative—and such action, for the most part, consists in the application of scientific knowledge derived from the "medical sciences" — anatomy, physiology, bacteriology, pathology and the like. The medical curriculum has undergone continuous change in response to the growth of these sciences and to the effect of this growth upon medical thought.

Dr. Crew, formerly professor of public health and social medicine, University of Edinburgh, is currently chairman of the department of preventive and social medicine, Ein Shams University, Cairo, Egypt.

Edinburgh restrictions of hospital medicine

In Edinburgh, as elsewhere, theoretical medicine is regarded as a superstructure built upon these medical sciences and these in turn rest upon the zoology, botany, physics and chemistry that the student encounters in his premedical year. It is during these years that the student's thinking is affected by his contacts with the concepts and methodology of these biological and physical sciences, that he comes to formulate his ideas concerning the nature of the universe and of man and concerning the nature and causes of the corruption of human perfection. By these his attitudes and

professional actions will later very largely be determined.

Contacts with the products of this educational system would seem to reveal that the student comes to look upon the human being as an organism living in an external physical world, an organism consisting essentially of a number and variety of tissues, organs and organ systems, all neatly interrelated and mutually interdependent, each making its own special contribution, usually of a definable physical or chemical kind, to the well being and continuance of the whole integrated system of tissues, organs and organ systems. Man, it would seem, can be described and understood in terms of physics and chemistry. He thinks of man as a member of an ecological system which includes micro-organisms, mites, helminths and the like, pathogenic, saprophytic, parasitic, and that within this system there is constant strife, mass antagonists being more malevolent than marvelous. He comes to regard disease as a lesion that affects one or several of the component parts, this leading to the faulty or grossly abnormal functioning of the part(s) and this in turn yielding morbidity of the whole.

These being his expanding views, it follows that he is in no way surprised to find that the organization of the medical profession is in accord with the prevailing notions concerning the nature of disease. The profession is fragmented into specialties:

(1) The individual as an integrated aggregation of component parts; disease a lesion affecting a part. e.g. dermatology, cardiology, chest surgery.

(2) The individual as a member of an ecological system. e.g. bacteriology, medical entomology, protozoology, helminthology, venereology, malariology.

(3) A field of some special diagnostic and therapeutic procedures. e.g. radiology, physical medicine, clinical chemistry, medical physics.

Nor is he surprised to find that the appropriate place for the learning and for the practice of this scientific medicine is the large hospital with its associated laboratories. Here alone are to be found the facilities for the application in diagnosis and therapy of advancing biophysical knowledge. Here alone can the faulty part be most readily identified and the exact physical or chemical nature of the lesion determined. Here alone can the repair of the fault be most hopefully undertaken. It is in the hospital that the technology of this scientific medicine is taught and learned. It is here also that the student cultivates his views concerning the spirit and the goal of medicine, concerning the place of medicine in society and concerning the role of medicine as an instrument of social policy. Such is the machinery that produces the medical graduate. The student is prepared for the practice of "scientific" medicine in the hospital sphere. This is truly remarkable for the high quality and for the efficiency of the work that is done therein. In the best interests of society it is essential that this hospital sphere shall expand and flourish.

If all medical practice was restricted to this sphere the present undergraduate curriculum would not need serious revision in respect of content. But it is not so restricted, for there is another and larger sphere, that of the home in open society. This domiciliary sphere is to be distinguished from the hospital sphere by many marked differences. In this country at the present time there are indications that this sphere of the general practitioner, of the family doctor, is

tending to become diminished in importance. Scotland's population numbers five million plus. Last year no less than half a million were inpatients of the hospitals and about two millions were out-patients with several million attendances. The out-patient department of the hospital is taking the place of the consulting room of the general practitioner so that an ever increasing number of the sick pass into the hospital sphere.

New factors in domiciliary sphere

In the domiciliary sphere it is quickly made manifest that medical care that stems almost exclusively from strictly physical and depersonalized considerations is not satisfactory, that the individual and his health or ill-health cannot adequately be described in physical and chemical terms and that the notion that disease is due to fault in the functioning of a component part no longer constitutes a working hypothesis that accounts for all the observed facts. The graduate, in such a sphere, recalls that in his courses on pediatrics and psychiatry he came to realize and then forget that the individual is not merely an organism living in an external physical world, not merely a member of an ecological system but also is a member of a particular society and of a stratum thereof and a product of a particular sub-culture. He now again encounters evidence that psycho-social factors, no less than biophysical, play their prominent parts in health maintenance and in disease evocation. His patient is a person with goals, fears, despairs, compulsions and aspirations and for health there must be harmony between himself and the conditions and circumstances of the social group of which he is a member. He comes to know that the dichotomy between the individual's organic processes and his emotional and social life is an artifact.

From the "medical sciences" and their superstructures he has received little or nothing of value to him in the solution of the problems he encounters and he begins to recognize the many deficiencies that embarrass his work, deficiencies due to the absence from his formal education of any contact with sociology, social psychiatry and cultural anthropology. Moreover, he comes to see that his reasonable delight in the scientific aspects of diagnosis, pathology, nosology and therapy has blinded him to the fact that disease, in the ultimate analysis, is suffering and is the enemy of achievement.

In the different medical schools different measures have been taken to include in the undergraduate curriculum instruction intended to equip the student for entrance into the sphere of domiciliary medicine. Here in Edinburgh before the inception of the National Health Service such instruction was offered in the several "dispensaries" that had been founded by private benefaction a century or so ago. But with the sudden enlargement of the social services and the introduction of the National Health Service these became redundant and lost their prime function for there were now no poor without medical care. Because of the undoubted value of the experience gained by the medical undergraduate while working in these dispensaries and in the districts they served and because the University Department of Social Medicine, then fashioning its policy, required a laboratory—a community—one of these dispensaries, well endowed, was transformed, with the eager collaboration of its governing body, into a general teaching practice unit and staffed by

members of the staff of the Department of Social Medicine. Later it was detached from this department and its affairs managed by a committee of the faculty of medicine consisting exclusively of representatives of the clinical subjects and, in respect of aim and basic philosophy, this unit has become an integral part of the machinery for the teaching of the dominant "scientific" medicine.

Attitude of general practitioners

In general, general practitioners are both unprepared and unwilling to develop domiciliary medicine as a sphere differing essentially in respect of aim and content from the hospital sphere. They wish it to be identical with the hospital sphere. They demand that they shall be officially associated with the hospital, shall be allotted beds therein and shall be provided with laboratory facilities equal to those of the hospital. In the field of research they wish to investigate the same kind of problem, using the same kind of methods as those studied and employed by the consultant and the specialist. In the group practice and in the health centre they wish to evolve into a group of specialists after the pattern of the staff of the large hospital. They want to do that which the specialist does and to be that which the specialist is, a practitioner of particulate medicine stemming from the biophysical sciences.

An active practical interest in the maintenance and augmentation of the health of the population is by no means a monopoly of the medical profession. As this profession has in increasing measure become absorbed in matters relating to disease and death, others have concerned themselves with matters relating to health promotion and to life and its fulfillment. Representatives of the applied aspects of the behavioral and social sciences, welfare and personnel officers, industrial psychologists, almoners and the like have occupied territory that has been neglected by the medical practitioner or from which he is withdrawing. Health and Welfare have become dissociated. Medicine is no longer interested in the total person in relation to his total environment.

If this is the considered policy of the profession it should be openly proclaimed and the domiciliary sphere handed over to other professional groups. But if it is maintained that the domiciliary sphere is important, and the best types of general practice show clearly that it can be, then the medical schools must play their part in the production of the family doctor and general practice must cease to be regarded within the profession and by the general public as an inferior form of the practice of medicine. The simplest way of raising the status of general practice is to make it as different as possible from that of the hospital.

Domiciliary medicine must, of course, rest partly on the biophysical sciences but as a springboard of action these are not as important in this sphere as are the social sciences. The family doctor is as much a sociologist, a social psychologist and a cultural anthropologist as a man of medicine, or he ought to be and needs to be. And for a variety of reasons an acquaintance within these disciplines would be a most valuable addition to the armamentarium of those who are to enter the sphere of the hospital.

It may be that the possibility of the advance in the domiciliary sphere lies in the hybridization of the current scientific medicine with those disciplines that deal with behavior from the aspect of group processes and

cultural dynamics. If this be so then to those departments that bear the title Social Medicine great opportunity may be given for it is herein that these disciplines could most appropriately be accommodated and brought into intimate contact with medicine both in teaching and research.

La Medicina como Ciencia social.

La enseñanza actual de la Medicina, en Escocia como en otros muchos lugares (según dice el autor, catedrático de Salud Pública y Medicina Social de la Universidad de Edinburgo), con su énfasis en las cienias físico-químicas, suele llevar al estudiante a considerar al hombre en términos de física, química y biología. Las enfermedades son consideradas como lesiones de una o varias de las partes componentes del organismo, lesiones que originan un funcionamiento defectuoso de esas partes y producen la morbidez del todo. La organización de la profesión médica con su división en especialidades está muy de acuerdo con esos conceptos, y el estudiante, por su parte, encuentra que los lugares más apropiados para adquirir conocimientos y practicar la Medicina científica son los grandes hospitales que se hallan asociados con grandes laboratorios. Es allí también donde el estudiante cultiva sus puntos de vista relativos al espíritu y fines de la Medicina y su lugar en nuestra sociedad. En suma, se prepara al estudiante casi exclusivamente para practicar la Medicina "científica" en el medio de hospitales. Mas existe otro mundo, no menos importante, el del *domicilio*, que hoy día se tiende a descuidar. La importancia del "médico de familia" va disminuyendo y el consultorio privado va siendo substituído en gran parte por los Departamentos de Pacientes Externos de los grandes hospitales. Mas el cuidado médico despersonalizado, basado casi exclusivamente en consideraciones estrictamente físicas, resulta insatisfactorio ya que el individuo y su salud no pueden ser considerados adecuadamente en términos exclusivamente físico-químicos. El joven médico que practica fuera de los hospitales, descubrirá—lo que una vez aprendió en sus cursos de Pediatría y Psiquiatría y luego olvidó—que el individuo no se meramente un organismo que vive en un mundo físico externo, que no es tan solo miembro de un sistema ecológico, sino que forma parte de una sociedad particular y que es el producto de una determinada sub-cultura. Entonces advertirá su falta de preparación en los campos de Sociología, Psiquiatría social y Antropoiogía, y lamentará que su legítimo deleite en los aspectos científicos de Diagnosis, Patología y Terapía, le impidiera ver que la enfermedad, en último análisis, es sufrimiento. Al reconocer tales deficiencias de la educación médica, se han tomado medidas que varían según las diferentes Escuelas, pero que tienden en general a incluir en el *curriculum* de los estudiantes instrucción en la práctica de la Medicina fuera de la atmósfera de hospitales. Estos esfuerzos son de importancia vital si la profesión médica ha de conservar un importante papel en la cuidado de la Salud Pública, la cual, en la medida en que en que la Medicina ha dejado de interesarse por el individuo total en relación con su ambiente total, se halla cada vez más en manos de especialistas legos. Una solución de ese problema se halla, tal vez, en la integración de la actual Medicina *científicia* con las Ciencias sociales. Los Departamentos de Medicina Social encontrarían una oportunidad magnífica en la estimulante tarea de poner en contacto a esas dos disciplinas tanto en lo que se refiere a la enseñanza como a la investigación.

Editorials and Comments

LETTER FROM NORWAY

Dear Editor:

I FEEL very honored by your letter asking for my views on some aspects of the relationships between medical schools and their universities. I am approaching the question somewhat hesitantly, but I presume that a little information about the origin and development of medical education in Norway may be of interest.

During the union between Denmark and Norway the University of Copenhagen, founded in 1478, was the natural center of academic life and education also for Norwegian students. The growing demand for independence among the Norwegians by the end of the 18th century was centered upon some important national issues among which the foundation of a Norwegian university was regarded as a most important question.

In 1811 the Royal Frederik's University was founded in Christiania (now Oslo). There was in the beginning some doubt whether medical education should be included in the teaching program of the new university. But the Norwegian members of the planning committee were confident that the hospitals of the city would be able to give competent teaching in the clinical disciplines. Three professors of medicine were appointed apportioning the following subjects between them: medical encyclopedia, medical history and literature, anatomy, physiology, dietetics, pathology and therapy, materia medica, pharmaceutics and the art of prescription, surgery and obstetrics, forensic medicine and hygiene.

The number of students was limited to three. On August 18, 1814 medical teaching was officially entered upon. The anatomy department established in 1815 is the oldest of all the scientific institutes of the university. Very slowly during the following decades other professorships were granted by the Norwegian parliament, the number of medical students was gradually multiplied, university institutes of physiology, pharmacology, hygiene, pathology, etc., were founded and the clinical teaching became more specialized. During the first half of the 20th century this development has continued. The medical faculty of the University of Oslo now comprises 32 full professors with a large staff of "docents" or associate and assistant professors and clinical teachers and instructors.

The modest start of the medical faculty of the university corresponded well with the rather poor hospital facilities in Christiania in the beginning of the 19th century. Two of the three first professors of medicine were assigned the treatment of the patients of the small local hospitals. Plans were prepared for the building of a hospital more in harmony with the demands of a university clinic. In 1826 the so-called "Rikshospital" (State Hospital) was opened with the professors of medicine of the university as heads of the departments, and with the responsibility of receiving patients from all parts of Norway. The expenses for the building of the hospital were defrayed by the Norwegian state. This hospital was completely rebuilt in 1883. During the first half of the 20th century a gradual and

thorough modernization of the "Rikshospital" has taken place, so that this main university clinic now presents itself as a very well equipped and staffed hospital of about 1,000 beds with highly specialized departments and several scientific institutes. The heads of the departments are simultaneously professors of medicine, teachers of their respective disciplines and members of the medical faculty of the University of Oslo. Thus there is an inextricable connection between the functions of the professors of medicine and the heads of the clinical departments of the State Hospital.

From 1888 the teaching of infectious and epidemic diseases took place at the epidemiological department of Oslo City Hospitals. As the number of medical students grew larger during and after the first World War, the big hospitals owned by Oslo City offered a much needed addition to the restricted patient material and teaching facilities of the "Rikshospital." In 1916 the chiefs of two medical and the surgical departments of Ullevaal Hospital (the main division of Oslo City Hospitals) were appointed university teachers of medicine besides the head of the epidemiological department. In 1950 they became full professors and members of the faculty of medicine. The same applies to the chiefs of the ophthalmological and the otolaryngological departments of Ullevaal Hospital and to the heads of surgery and internal medicine of Aker Hospital (another division of Oslo City Hospitals). At Ullevaal Hospital are also situated the University Institute of Experimental Medical Research and the University Institute of Respiratory Physiology, in close cooperation with the Surgical Department III.

I have deliberately presented these detailed historical facts about the development of medical teaching in Norway. With this background it is easy to understand that the medical school of the University of Oslo is an integral part of the university itself. For most Norwegians the concept of a medical school independent of the university would seem strange because of the inseparable bond of union between the two from the very beginning of higher academic education in Norway.

The second medical school in Norway was established as part of the University of Bergen founded in 1948. The different basic scientific departments are still incomplete. The professors of the clinical disciplines are heads of the respective special departments of Bergen City Hospitals. The teaching of anatomy, physiology and of a few of the clinical specialties is not possible with the present facilities at the University of Bergen, which in this period of organization depends upon the University of Oslo in these respects.

The inauguration of another medical school in Norway in our days is thus following the same pattern as was the case with our first medical school. The foundation of a university creates the background. The medical school is at the same time one of the roots of the university and its growth is intimately linked with the development of the university as a whole—like a limb of a common structure.

This account of the close relationship between the medical schools and the universities of Norway does not imply that all higher academic education in this country is confined to the two universities. Before the University of Bergen was established in 1948 the Bergen Museum was the higher academic center of western Norway with a staff of scientists of high reputation particularly in fields like zoology, biology, oceanography, meteorology, etc. The Norwegian High School of Engineering is situated

in Trondheim, the High School of Agriculture a few miles outside Oslo, the High School of Odontology and the High School of Veterinary Medicine in Oslo, also separate administrations. The teachers of all these state institutions have the title and privileges of professors, and are appointed by the Government.

The intimate relationship between the medical schools and the universities of Norway may constitute a drawback with regard to pecuniary appropriations. In the university committee on estimates and in the Parliament debate of the state budget for the financial year the university is considered as an entity. Grants voted towards the university will have to be divided between the different faculties. It is difficult to decide whether a medical school as an independent financial administration would draw more money from the keeper of the national purse of Norway than it does under the present circumstances. The favorable attitude of the financial authorities of the Government and the Parliament towards medical research and teaching will probably be more influenced by a high professional and ethical standard of the faculty members than by the administrative independence of the medical school.

The medical sciences with their requirements of close cooperation on the one hand with other basic sciences, on the other hand with the humanities and the gradually expanding social sciences, seem so dependent upon a broad academic setting that medical schools in my opinion should be an organic part of a university. A medical school without or with loose relations to a university may be an excellent institute for turning out good professional workers in medicine but will always be in danger of losing imponderable qualities that may be summarized as "the universality of the specialties" or expressed in the words of the Roman Terentius: "Homo sum, nihil humani a me alienum puto." Yours sincerely, KRISTIAN KRISTIANSEN, M.D., *Oslo, Norway.*

A New Medical College in India

REPORTS INDICATE that plans are moving ahead quite satisfactorily for the All-India Medical Institute which is intended to take leadership in the further development of medical education in India. There are about 39 medical colleges in India according to Wahi[1] and as in other countries there is a serious shortage of qualified educators for faculty posts. The All-India Institute will produce men and women who are competent to fill this shortage through their ability as teachers and investigators.

The faculty will be drawn primarily from India and, in recent weeks boards have been convened in London and in New York to interview Indian candidates, currently in graduate programs in the United Kingdom and in the U. S. A. A final selection board will gather in New Delhi in June 1956. The first class of 55 students will enroll in August 1956.

Medical education in the U. S. A. will be anxious to support the Government of India in this highly important development and the *Journal of Medical Education* extends congratulations to the Health Minister of India and her associates who have supported the culmination of this plan. J.Z.B.

1. WAHI, P. N.: "Medical Education in India," *J. Med. Educ.*, 31, 249, April 1956.

A Senior Research Fellowship Program

In the budget of the Department of Health, Education and Welfare, and approved as an item in President Eisenhower's budget submitted January 16 for the year beginning July 1, 1956, is provision for funds to foster research in the preclinical sciences through the device of senior research fellowships.

After a painstaking study of the problem of increasing the presently inadequate number of teachers and investigators in the preclinical sciences, the decision was reached by the Public Health Service that the most promising approach lay in providing support for a number of such investigators through the critical period between the completion of formal training and elegibility for permanent higher academic appointments.

Under this new program each medical school, dental school and school of public health will be invited to submit each year up to but not exceeding three applications for fellowships. These applications will be reviewed by special selection committees of nongovernmental scientists and finally by the National Advisory Health Council.

Applications will be submitted by the school on or before September 1 of each year on special application forms and a report of the final action taken will usually be available, it is expected, no later than October 30th. Included in the application will be: A general statement of the candidate's research plans for the five-year period of the fellowship award; certification that the candidate is an American citizen; a brief statement of the school's plan for the development of the candidate; a statement from the school which will verify that the fellowship will be used to add a new person rather than substitute fellowship support for school support of a person previously on the staff; a budget, consisting of candidates salary (not to exceed $1,000), partial research expenses (not to exceed $2,000 and including costs of attending scientific meetings) and indirect costs (not to exceed 15 per cent).

This program would appear to be an important one, well conceived and soundly planned. It is certainly to be hoped that funds for its implementation will be provided by the Congress. D.F.S.

Our Readers Write

Dear Editor:

The Medical Education for National Defense Committee of Georgetown University School of Medicine staged a mock disaster on April 25, 1956. The authorities of the university hospital were forewarned that they would be confronted with an unknown, but large number of casualties at sometime during a specified two-week period.

The sophomore medical students constituted the casualty list numbering 97 in all. They were decorated with skin marking pencils to depict their injuries, using a color scheme previously made known to the hospital staff. Two classes of students from the nursing school were utilized as anxious relatives of the injured. Each of these girls was given the name of a casualty and charged with the task of obtaining infor-

mation about his condition, location, etc. Half of these girls were instructed to phone the hospital and half were dispatched directly to the hospital.

Maintaining the element of surprise, a phone call was placed to the hospital at 8:25 p.m. on the fourth day of the stipulated two-week period, announcing that Operation Hoya was in effect. It was further announced that a boiler had exploded in the university gymnasium during a basketball game and that a large number of casualties had resulted. The transportation problem was deliberately by-passed and the casualties began appearing at the hospital 15 minutes later.

A number of valuable lessons were learned from this project. First, it was obvious that the hospital staff had a keen interest in the problem of disaster medicine and its members were pleased to be confronted with a concrete problem. Second, the value of a realistic rehearsal in pointing up strong and weak features of a disaster plan cannot be sufficiently emphasized. Third, all persons who participate in or observe such an operation become missionaries to the cause of better medical preparedness.

Sincerely, JAMES E. FITZGERALD, M.D., Co-ordinator, MEND Program.

NEWS DIGEST

Chicagoan New President of SAMA

Kent Guild, Northwestern University medical school junior, was elected president of the 18,000 member Student American Medical Association during it sixth annual convention in Chicago May 4-6. Michael P. McQuillen, Georgetown University junior, was named vice president and Barry Manuel, Boston University sophomore, treasurer.

Thirteen hundred medical students from 68 approved medical schools attended the convention to discuss such problems as minimum salaries for interns in hospitals, help for students with long-term illnesses and nondiscrimination in selection of medical school applicants.

The house of delegates, the SAMA's policy-making representative body, went on record as favoring "democratic rights" in medical education. Approval was voted of a resolution stating that the SAMA forbids discrimination against membership applicants on the basis of race, religion, nationality or sex.

Results of a geographical cross section questionnaire of 1,450 interns was revealed at this time and indicated that the nation's future doctors criticize some aspects of the hospital training they receive as interns, but feel it is essential to their preparation as physicians. More than 90 per cent of them said their greatest difficulty was low salaries and lack of opportunities for outside jobs.

MEND News

The National Coordinators office of the Medical Education for National Defense program has announced the appointment of an Executive Secretary. He is Donald Smith, a graduate of the University of Minnesota with a master's degree in hospital administration. Mr. Smith is completing three years of service with the Army and upon termination will take up his MEND duties in the Washington office. Dr. JAMES R. SCHOFIELD, National Coordinator, will continue to superintend the affairs of the program with Mr. Smith handling fiscal and purely administrative affairs.

MEND Slides Available

The slide material of the MEND teaching collection is now available commercially. Selections in the collection were made primarily by Dr. John Shapiro, professor of pathology at Vanderbilt University College of Medicine, and accumulated by the Armed Forces Institute of Pathology. Schools wishing to purchase duplicates can contact George Jorgensen, 915 Fifteenth Street, N. W., Washington, D. C.

$50,000 Cancer Grant to Duke

The Damon Runyon Memorial Fund has granted $50,000 to Duke University to support the research project of Dr. Marcus E. Hobbs. Dr. Hobbs is conducting a study of the physical and chemical properties of

some Aerosols. This is the fifth year that the fund has supported this project. Also, for the first time, a grant was made by the cancer fund to an institution in Australia. A sum of $4,500 was sent to Dr. G. H. Badger at the University of Adelaide in South Australia where he is making a study of the process of tar formation.

NHC Fellowship Program

The National Health Council has announced the establishment of a senior research fellowship program in the National Institutes of Health, contingent only upon the final appropriation of necessary funds by Congress.

Purpose of the program is to attract and hold able investigators in the preclinical sciences. There will be 40 to 50 awards made in the first year with plans to increase them by a like number each year for five years, providing thereafter from 200 to 250 Senior Research Fellowships annually.

Information concerning stipends, allowances and dates for submission of applications and for announcement of final action is available by writing to the Research Fellowship Branch, Division of Research Grants, National Institutes of Health, Bethesda 14, Maryland.

$125,000 Mental Health Fund

The setting up of a $125,000 Mental Health Fund for use during the calendar year 1956, has been announced by the Smith, Kline and French Foundation.

The fund was announced at the start of National Mental Health Week (April 30, 1956) by the philanthropic foundation which was set up three years ago by the Philadelphia pharmaceutical house.

Principal beneficiaries of the fund will be basic research, psychiatric training and professional and public education. First grants announced were a $30,000 donation to the American Psychiatric Association to further the psychiatric fellowship program initiated by the APS under a similar grant last year; and a grant of $1,500 to the Child Study Center in Philadelphia for the child psychiatry training program.

AHA Research Awards

The American Heart Association is accepting applications by research investigators for support of studies in or related to the cardiovascular field. The awards would be for the fiscal year beginning July 1, 1957. Application deadline for research fellowships and established investigatorships is September 15, 1956. For grants-in-aid applications must be made by November 1, 1956.

Funds for the research support program are provided from public contributions made to the annual Heart Fund appeal. At least half of all monies received by the American Heart Association national office are allocated to research.

Dr. Sells Receives Award

Dr. Saul B. Sells, head of the Air Force School of Aviation Medicine, has been given the Raymond F. Longacre Award of the Aero Medical Association. The award was presented to Dr. Sells in recognition of his studies over the past several years to develop a battery of psychiatric tests that will reveal the future reactions of air force flyers to the stresses of combat missions.

By coincidence, Dr. Sells' work is an extension of the project for which the late Dr. Longacre was best known. As head of the school's department of neuropsychiatry from 1921 to 1924, Longacre formulated a comprehensive personality test to show latent tendencies which might later affect a pilot's performance under stress.

New Radioisotopes Book

The United States Atomic Energy Commission has just issued an 817 page book entitled "Radioisotopes in Medicine" and dealing with the complete proceedings of a special course on the subject which was conducted

by the Oak Ridge Institute of Nuclear Studies in September of 1953.

The book contains papers by outstanding authorities in the fields of medicine and radioisotopes including the availability and uses of isotopes; problems in radiation; radiation measurement and dosimetry; tumor localization; diagnostic and therapeutic uses of radioiodine; and metabolic and vascular studies.

"Radioisotopes in Medicine" is on sale from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Cost is $5.50.

National League Nursing Awards

The National League for Nursing has announced awards of 20 fellowships for doctoral study and 14 for masters study in nursing, made possible through a grant from the Commonwealth Fund. The awards, totaling nearly $168,000 for 1956, are part of an annual fellowship program designed to meet the need for more qualified nurses in leadership positions by assisting them to prepare for positions of greater responsibility in all areas of nursing service and nursing education.

College Briefs

Cornell

Dr. WALTER F. RIKER Jr. has been appointed professor of pharmacology and chairman of the department. He will take over his new duties on July 1, when Dr. MCKEEN CATTELL will retire as chairman although continuing his duties as professor of pharmacology.

Duke

A $21,982 Lederle Medical Faculty Award has been awarded for Dr. JOHN R. OVERMAN. Dr. Overman, currently a physician and virus specialist at the Rockefeller Institute for Medical Research in New York will join the faculty July 1 as associate professor of bacteriology. The three year grant will take effect at that time.

Harvard

Dr. JOHN FRANKLIN ENDERS has been promoted to professor of bacteriology and immunology at the Children's Hospital. Dr. Enders is a winner of the 1954 Nobel Prize in physiology and medicine, and noted for his investigations in problems involving bacterial and viral infections.

A three year research grant of $30,000 has been awarded the department of tropical public health by the Lederle Laboratories Medical Faculty Award. Purpose of this grant will be to study and investigate by the tissue culture method, chicken pox, German measles and other infectious diseases.

Illinois

A medical television series designed to acquaint viewers with the educational and medical functions of the various departments is being shown weekly in Chicago on the city's educational TV station WTTW. Method of presentation varies by departments but includes the use of case studies, patients and equipment. Among departments appearing on the program are pathology, surgery, neurology, dermatology and physical medicine.

Iowa

DR. ROBERT HARDIN, professor of internal medicine, has been awarded a grant by the Institute of Arthritis and Metabolic Disease, National Institutes of Health, of $8,000 per year for a five-year period starting July 1. Dr. Hardin is interested in the follow-

up studies of patients with diabetes regarding long term care and incidence of complications in relationship to the type of therapy.

Medical Evangelists

A $26,500 grant from the U. S. Public Health Service has been awarded Dr. James Quilligan and Dr. Paul Kotin to study the effect of air pollutants, singly and in combination, on living tissue free of virus infection as compared with infected tissue. The grant covers the first year of the project.

Oregon

A total of $151,936 in grants has been received with most of the funds allocated to specific research problems. Largest single grant was for $49,621 from the U. S. Public Health Service to be used in leukemia research under the direction of Dr. EDWIN E. OSGOOD, professor and head of the division of experimental medicine. Also allocated by the Public Health Service was $32,912 to Dr. THOMAS FITZPATRICK, Dr. CARL HOPKINS and Dr. FARRINGTON DANIELS for work on the effects of sunlight and ultraviolet light on man. Heart research, rheumatism and neurological research has also been aided by grants.

Puerto Rico

A total of $430,780 in support of research and teaching projects, representing 37 individual grants, was received during the current fiscal year. Fourteen separate research projects were supported by the various institutes of health. The Rockefeller Foundation, through a grant to the Commonwealth Department of Health, provided the sum of $63,500 for a survey of the public health facilities in the Bayamón Region. The International Cooperation Administration provided $100,000 for support of public health curricula. The Guggenheim Foundation, Department of the Army and the National Fund for Medical Education, also provided grants.

SUNY

A new fellowship program designed to provide an opportunity for pediatricians to prepare for an academic career in pediatric education with an emphasis on the social science and psychological aspects, will be initiated in the fall. The program provides a three year training period with the appointment of one fellow each year, so that a maximum of three fellows will be in training at one time. Candidates should have completed their residency training in pediatrics. Inquiries should be addressed to: Dr. JULIUS B. RICHMOND, chairman and professor, department of pediatrics, SUNY at Syracuse. The program is being supported by a grant from the Commonwealth Fund.

Dr. HARRY A. FELDMAN has been promoted to chief of the section of preventive medicine. Dr. PAUL BUNN and Dr. EUGENE L. LOZNER have been promoted to full professorships in the department of medicine. At Brooklyn, Dr. Jack Gross has been promoted to full professor in the department of anatomy and Dr. FRANK C. HAM to professor in the division of urology, department of surgery.

Tulane

Dr. R. V. PLATOU, professor and head of the department of pediatrics, has been awarded a grant by the Rockefeller Foundation to evaluate methods of training in pediatrics abroad. Dr. Platou will leave for Europe in June and spend four months conferring with authorities in some eight European countries. He will participate in an International Congress of Pediatrics to be held in Copenhagen in July.

Medical Television: An Evaluation

FRANK Z. WARREN

MEDICAL television has been with us eight years.

February 1947, marked the first definitive utilization of the television medium for the transmission of medical information. Since then, the medical calendar has been studded with TV programs of varying types, formats and methods of transmission.

The earliest were of the "doctor-to-doctor" variety. The programs usually emanated from some hospital or clinical teaching center, and were beamed at a conclave of physicians meeting in a nearby convention hall. The Smith, Kline and French and E. R. Squibb programs were of this type.[1] Engineering-wise, they were restricted to specific telephone channels, and were viewed at preselected receiver sites. Because of this exclusivity, they were referred to as *closed-circuit* telecasts.

Doctor-to-doctor communications were soon followed by doctor-to-public programs, for the purposes of public information, education and public relations. In contrast to their closed-circuit cousins, these presentations went out over the open air. Utilizing local TV stations, they could be viewed on any TV set within range. Their geographic coverage included whole counties, states, regions. In fact, by linking local stations in a network, the medical message could be carried to virtually the entire country. Thus, their general accessibility led to calling them *open circuit* programs. (A more detailed explanation and chronology is available.[2])

Judged in retrospect, these pioneer programs achieved varying levels of effectiveness. For the most part, their methods were on a hit-and-miss basis. Experience was the only guide, and there was very little of that.

Yet, as preliminary efforts they were all extremely important stepping stones. However faltering, it was fortunate for medical education that these steps were taken. Not only was it imperative to know where TV could be used, but of equal importance was ascertaining the areas where the medium was *not* applicable.

Early medical programmers and producers learned to their dismay that TV was not the free-and-easy proposition many enthusiasts had described. It soon became apparent that there were many restrictions with which they had to cope.

One of the first they encountered evolved from the nature of the material itself. The program producer discovered that a body of medical information could not be transferred verbatim from the lecture podium to TV. Considerable reshifting and reshaping had to be done. In addition to a high degree of visualization, the exigencies of TV called for a marked purification of lecturing methods and manners. Time-honored deadwood in the context became plain "dead air" on TV. Monotonous paper readers, speechifiers and dull or disinterested speakers were exposed as deadly bores. On TV, *time* being of the essence, each fact, talk, demonstration or lecture had to be reexamined in the fresh light of essenti-

Dr. Warren is Audiovisual Coordinator, New York University Postgraduate Medical School. This article is revised from the proceedings of February 8, 1956, Conference on Television in Postgraduate Medical Education.

Rx for New Physicians . . .

THE NEW TYCOS®

HAND MODEL ANEROID

A long-term investment

THE blood pressure instruments your students buy are long-term investments. Suggest they buy wisely . . . buy an American-made instrument that can be serviced promptly and properly over the years . . . buy the TYCOS dependability that doctors have trusted for 49 years *plus* these new TYCOS improvements.

We've built the inflating bulb and the air release valve right into the back of the gage and balanced the new unit so that the whole instrument fits comfortably into your hand—works equally well for right and left-handed doctors.

Practicing physicians have field-tested the new instrument for months. They tell us: "The more we use it, the better we like it." These doctors like:

- Holding the new gage where it was handiest for them—always knowing that peering patients couldn't see the dial.
- The convenient big thumb screw on

Taylor Instruments **MEAN ACCURACY FIRST**

for your students . . .

the release valve—giving even pressure release, or instant complete deflation.

- The new valve—a floating stainless-steel ball instead of the conventional needle valve.
- The single tube—with Luer lock fitting to let you apply the Hook Cuff before you attach the gage.

Accurate in any position . . . always accurate when the pointer returns within zero . . . and the same famous TYCOS 10-year triple warranty. Complete with genuine leather zipper case and Hook Cuff, weighs only 18 ounces. **Price $47.50.**

• • •

Your surgical supply dealer will show you this new TYCOS next month—shipments to our dealers beginning in July. *Entirely made and serviced in U. S. A. by skilled instrument technicians.*

Taylor Instrument Companies
Rochester, N. Y., and Toronto, Canada.

Taylor Instruments MEAN ACCURACY FIRST

ality and brevity.

Successful programmers were aware of this. Dull, time-wasting programs resulted when these principles were ignored.

But quite apart from the basic textual revision, medical programmers were startled to learn of a much more ruthless editor—the type of TV circuit to be used—for it forced them to slant the remaining material to conform with the *method* of transmission.

This was a most distressing handicap to the medical programmer for he found himself faced with a dilemma—open circuit or closed circuit? Ethics and good taste obviously restricted the dissemination of intimate professional material over the open air, yet much of it was essential for teaching purposes.*

Closed circuit, on the other hand, did permit effective medical presentation, untrammeled by fear of unauthorized viewing. However, its main disadvantage was that despite its effectiveness at conventions and on special occasions, the closed circuit method could not serve medicine capably on a year-round basis due to its inability to reach individual physicians in their homes and offices. The expense involved in connecting the viewing sites made the method feasible only when large numbers of viewers were participating in groups. Intracity and intercity cable rentals ran into thousands of dollars *per hour* for the average program. Cable interconnections to the individual physician obviously would have been economically impossible.

Unfortunately, closed circuit programs which brought the doctor to the program instead of having the program brought to the doctor had to entertain the possibility of disappointing attendance figures. It was more than just a question of courtesy or comfort. Closed circuit program attendance was directly related to the heightened complexity of the average doctor's daily schedule. Decreased leisure time, increased office problems, acute traffic and parking problems resulted in a situation where many doctors who were willing to attend found the physical difficulty of getting there a forbidding obstacle.

And so, when a question of a forced decision between open circuit or closed circuit—the medical program planner made his choice, and the medical program always lost a little by it.

Today, with the perfection of a new means of electronic transmission, we are no longer compelled to weigh the advantages and disadvantages of one system against the other. Scrambled image television, (controlled open circuit television) combines the best features of both systems. It has improved considerably since its first trial at the Academy of Medicine.[4] In principle it is relatively cheap and readily available. It can reach the physician in his home or office, and by creating *private pathways through* the air it can obviate the high cost of closed circuit cable transmission. Since it can accomplish this flexibly and inexpensively, controlled open circuit television is the answer to many present and future problems of medical television transmission.

What is a scrambled image system and how does it work? On pages 68 and 69 of "TV in Medical Education," published by the AMA Bureau of Health Education, there is a brief technical discussion of this method. For present purposes, let us just say that a scrambled image system is like an ordinary TV system except that the waves carrying the sound and picture portions of the program are distorted or scrambled. A *coder* or scrambler at the TV station accomplishes this distortion, and a *decoder* or unscrambler at your TV set straightens the waves out again.

Obviously, only sets equipped with a decoder will be able to receive the scrambled TV program in a form

*In 1954 the University of Utah experimentally presented a series of four medical programs over an open circuit, using uncoded transmission. In an effort to discourage unauthorized viewers the program time of 7 A.M. was chosen.[6]

suitable for viewing.

Additional individual security systems accompany each decoder. Since the distribution of these medical decoders can be regulated by medical agencies, we see how a scrambled image system could provide a private TV network for doctors alone.

Three companies are engaged in the manufacture of scrambled image decoders. Although they differ in specific details, the underlying principle of operation is the same.

To date, none of the three systems is in active operation because they are not fully approved by the Federal Communications Commission. It is our hope that this approval will soon be forthcoming. The sooner this method becomes available, the sooner will we be able to harness its potential. Some observers claim its potential is apparently boundless, although how it will be realized in actual practice remains to be seen. Nevertheless, perhaps we should recognize the fact that we have been handed a means of enlarging the boundaries of the medical teaching area to include postgraduate classes numbered in thousands, instead of scores.

In contemplating the effect of controlled open circuit television upon medical communication, it is difficult to restrain the imagination. Most probably we can look forward to the establishment of a nationwide network of scrambled image TV centers. From here on, our predictions approach science-fiction in their scope. Unparalleled intercommunication between universities, free interchange of ideas, and confidential medical consultations and conferences will be held over this network. The expert advice and opinion of the outstanding medical authorities will be available throughout the nation by long-distance scrambled image video consultation. Already this application was demonstrated in a preliminary way in January 1955, when a long distance TV consultation was held between surgeons and pathologists in Washington, Philadelphia and Baltimore.

A confidential medical TV network will allow the teaching talents of the foremost medical educators to be shared by students in all geographic locations, instead of keeping them restricted to one medical center. It has been observed[5] that the intimacy and immediacy of TV, applied to many situations in the instructional process, compares favorably with the personal contact and effectiveness provided by a private tutor.

Research workers, interconnected in a nationwide network, will contribute their techniques and abilities toward a universal pool of knowledge. Using the new electronic color camera and vidicon color system, a TV instrument particularly adapted for research, 15,000 research workers from coast to coast can peer down the barrel of the same microscope and share as a common experience the knowledge gained from viewing an identical microscopic field. This may well herald a golden age of research.

But all these things will be possible only if there is peace of mind concerning unauthorized viewing. Without the security and privacy of scrambled image television, none of this is practical. If seen by the laity, medical communications would be subject to misuse and misinterpretation. Even now, on our public health programs, medical information must be handled carefully in order to avoid creating erroneous impressions in the minds of viewers.

Without scrambled image TV, doctor-to-doctor programs can never approach full effectiveness. With it, medical communicators can attain the reportorial freedom required to achieve the medical equivalent of a Columbia Broadcasting System.

I humbly suggest that with scrambled image television standing by to render powerful assistance, the forecast for the future is bright indeed. Postgraduate schools will be able to offer courses brought by TV to the physicians in the comfort and convenience of their own homes and offices, a desirable learning site. Because of the mass audience, the cost of the telecourses can be scaled down to a fraction of the fees now being

charged for postgraduate courses. This is not just theory, for one of the foremost postgraduate medical schools in the country is presently considering an extensive series of telecourses, enabling more physicians than ever before to benefit from continuing education.

There is still one obstacle. These efforts must await official FCC go-ahead. It is quite likely that the medical fraternity will be consulted prior to a final decision regarding this approval. May I humbly submit that as doctors and medical educators, our stand is clear:

While the medical profession is not interested in the entertainment features of scrambled image television, this method of transmission, as it applies to medical telecourses, is of such vital significance that we must lend it our support in principle.*

In an effort to obscure the basic issues, opponents of scrambled image television have mentioned a misleading term—"the freedom of the airwaves." The inference is that scrambled image TV robs the everyday citizen of this freedom. It is not inconceivable that this question might impede the acceptance of the entire method.

Here, too, our position is self evident, since it is generally agreed that at least in medical communication, freedom of the airwaves is not desirable. On the contrary, the ideal is a secure, confidential channel of transmission, unobserved except by the profession.

The public service value of scrambled image television deserves particular attention. Postgraduate courses readily available to physicians everywhere will eventually result not only in raising educational standards, but also in an elevation of the quality of professional care. There is a time lag in getting knowledge of the latest developments of the large medical research centers into the hands of the doctor in the field—the general practitioner. Poor communication is partly responsible. Scrambled image TV can overcome this by providing a continually flowing pipe-line of information *directly* to the individual doctor.

Ultimately, scrambled image television could result in better health for everyone.

*Since February 1955, when this statement was made before the Conference, the following organizations have gone on record as supporting the method in principle: American Medical Association, American Dental Association, Association of American Medical Colleges, American Academy of General Practice and many others.

REFERENCES

1. Elsom and Roll: *J.A.M.A.*, Vol. 147, pps. 1550 to 1554, December 15, 1951.

2. Warren, Frank: "TV in Medical Education," A.M.A. Council on Medical Education and Hospitals, pps. 75, 76, 77, February 1915.

3. Holleb and Buss: *J.A.M.A.*, Vol. 156, pps. 298-302, September 25, 1954

4. "First Scrambled Image TV for Doctors," *J. Med. Educ.*, Vol. 29, p. 61, January 1954.

5. Fritz, Humphrey, et al: Special Devices Center, Human Engineering Report, 530-01-1.

6. Warner, Robert: "Postgraduate Television Clinics at Utah," *J. Med. Educ.*, Vol. 29, pps. 61-2, January 1954.

up for adoption!

Three editions much in demand — and a new one on the way!

LOUIS S. GOODMAN and ALFRED GILMAN

THE PHARMACOLOGICAL BASIS OF THERAPEUTICS, 2nd Ed.

"... a reference in pharmacology in the classical sense which presents every phase of drug action ... truly an encyclopedic book ... because of general excellence of presentation and up-to-date character, this textbook can be recommended."—*Journal of Medical Education* (1955)

1,848 pages $17.50

ANDREW THEODORE RASMUSSEN

PRINCIPAL NERVOUS PATHWAYS, 4th Ed.

"A dynamic and functional view of neuroanatomy is presented throughout. This is to be commended, not only as an aid to the study of neuroanatomy, but for its subsequent correlation with the understanding of neurophysiological processes, clinical neurology, and neurosurgery."—*Journal of Medical Education.* (1952)

73 pages Size: 8½" x 11" $4.50

EDWARD S. WEST and WILBERT R. TODD

TEXTBOOK OF BIOCHEMISTRY, 2nd Ed.

"The book is well produced, clearly written, extensive bibliography, excellent index ... a sound comprehensive, authoritative, up-to-date picture of modern biochemistry."—*Annals of Internal Medicine.* (1955)

1,356 pages $12.00

EDWARD S. WEST

TEXTBOOK OF BIOPHYSICAL CHEMISTRY, new 2nd Ed.

(formerly Physical Chemistry for Students of Biochemistry and Medicine)

Because application of principles is discussed, the student is able to see the physical chemical principles in physiological operation. Much of the text comprises material from the second edition of *Textbook of Biochemistry* by West and Todd. The Brönsted concept simplifies biochemical problems such as acid-base balance. The treatment of isotopes particularly suited to tracer studies has been expanded.

Publication: June Approximately 372 pages Probably $6.50

ORDER NOW FOR YOUR NEW CLASSES!

at your bookstore or

The Macmillan Company

60 FIFTH AVENUE, NEW YORK 11, N.Y.

Book Reviews

Psychophysiologic Medicine

Eugene Ziskind, M.D., Lea & Febiger, Philadelphia, 1954, 370 pages

This book arose out of the author's experience in teaching psychotherapeutic medicine to general practitioners and specialists in areas other than psychiatry. The book is directed toward an audience comprised of those groups but, because of the emphasis upon problems treatable by the non-specialist in psychiatry, it may find some use in the teaching of medical students. The first portion of the book is devoted to defining the area in which the non-specialist may properly function, with case histories illustrating clinical problems of a nature amenable to non-specialist treatment. The author next presents a simplified exposition of psychopathology which he feels can serve as a beginning orientation. The second portion of the book is devoted to a detailed presentation of interviewing, its technique, purpose and the meaning of the interview findings. A major emphasis here is the use of the interview as a psychotherapeutic as well as a diagnostic technique. The third portion of the book considers in some detail certain patterns in early life relationships which may lead to the development of unsatisfactory patterns of behavior, a chapter on social factors in psychopathology, a consideration of differential diagnosis and finally a discussion of psychiatric emergencies in general medical practice. Part four presents somewhat more technical information for students who may be interested in the history of the development of dynamic psychiatry, some current and differing theoretical dynamic positions and finally a discussion of "mental adaptive mechanisms" and certain "diseases commonly called psychosomatic". The latter includes a discussion of asthma, peptic ulcer, essential hypertension and ulcerative colitis.

In general, this book can be recommended for the use which the author intends—that is, as an introduction to the emotional aspects of illness for the general practitioner and non-psychiatric specialist. It can also be recommended as an ancillary text in psychiatric curricula for medical students; it is not intended nor can it be recommended as the sole textbook for medical students because of its brief and superficial discussions of the clinical problems of psychiatry itself—subjects such as psychosis, etiologic rather than symptomatic treatment of neurosis, personality disorders, organic brain syndromes and the like. The psychiatrist could find cause for criticism in the treatment of certain areas. For example, the author's viewpoint is so eclectic as to raise the serious question that the views he presents, particularly in regard to psychotherapy, emerge more as a potpourri than a cautious but useful objective appraisal. Moreover, the author makes such frequent and defensive reference to the "controversy and confusion that afflicts psychiatric theory" (as though this were not equally true of theory in other areas of medicine) that he unquestionably reinforces the all too frequent suspicion and condescension of the novice toward psychiatry. Despite this, it must be said that Dr. Ziskind's brief expositions of current psychiatric theory are clear, accurate and informative. These latter observations are peripheral, however, because they will concern only the professional in this area and the book is not directed to him. Importantly, the author repeatedly distinguishes between those problems with which the non-specialist may expect to deal and those which should be reserved to the psychiatrist.

Robert Roessler, *Wisconsin*

Handbook of Physiology and Biochemistry

R. J. S. McDowall, M.D., D.Sc., Blakiston Division, McGraw-Hill, New York, 1956, 759 pp. with index.

The author has presented a rather broad coverage of the subject matter of human physiology in concise style. The brevity of the presentation has necessitated in many instances the omission of explanatory material, inclusion of which

would facilitate the thorough understanding, by the beginning physiology student, of the basic mechanisms involved. Objection to the book on this basis could easily be overcome by supplementing it with well-designed lectures.

Arrangement and organization of the material is generally good although it is rather puzzling that the final chapter which considers mainly the adrenals bears the title "The Ductless Glands" while other such glands as the thyroid parathyroid, pituitary, testis and ovary are considered elsewhere. There is an adequate number of well-chosen illustrations usefully arranged in the text.

Citations in the bibliography are confined for the most part to important monographs and reviews. Supplementations of these citations for some subjects would be in order.

There is a short appendix which includes typical values for certain measurements frequently encountered in the study of physiology and which describes briefly methods for blood cell counts, hemoglobin estimation and gas analysis.

The reviewer has difficulty convincing himself that inclusion of the words "and Biochemistry" in the title of the book is justified by the quantity of the text devoted to this field.

Alfred H. Chambers, *Vermont*

Books and Pamphlets Received

(As space permits, those with the greatest interest to our readers will be reviewed)

Diseases of the Skin

Richard L. Sutton Jr., M.D. The C. V. Mosby Company, St. Louis, 1956. 1479 pp with index.

Electrodiagnosis and Electromyography

Edited by **Sidney Licht,** M.D. Elizabeth Licht, Publisher, New Haven, Connecticut, 1956. 272 pp with index.

The Doctor in Personal Injury Cases

Harold A. Liebenson. The Year Book Publishers, Inc., Chicago, 1956. 123 pp with index.

Starling's Human Physiology

Sir Charles Lovatt Evans, LL.D., Lea & Febiger, Philadelphia, 1956. 1232 pp with index.

The Personnel Exchange

Faculty Vacancies

• ASSOCIATE OR ASSISTANT PATHOLOGIST: To Dr. David R. Meranze, Board certified or eligible. Major, general hospital, medical school affiliated; active teaching and research institution. Highly qualified staff. Address: Albert Einstein Medical Center, Southern Division, Philadelphia 47, Pa.

• TEACHING FELLOW IN OPHTHALMOLOGY: Position available immediately. Applicant must have completed at least two years of approved residency training and be licensed, or eligible for licensure in Indiana. Salary $6000. Apply to Fred M. Wilson, M.D., professor of ophthalmology, Indiana University Medical Center, Indianapolis 7, Indiana.

• BACTERIOLOGIST: Assistant professor, Dalhousie University Medical School. Teaching of medical and science students. Opportunities for clinical and academic research; new laboratories being planned. Apply stating salary expected to the professor of Bacteriology, Pathological Institute, 62 University Avenue, Halifax, Nova Scotia.

• MEDICAL WRITER: "Gray flannel suit" type, 25-35 years old with imagination, science background and talent for concise, effective prose. Job entails contacting physicians; planning scientific convention displays; writing, directing medical movies. Salary dependent on experience and demonstrable ability. Liberal benefit program. Eastern manufacturer. Send complete resume. Address: V-45.

• M.D. or PH.D: Well-experienced in diagnostic microbiology and in teaching medical students who desire to work in the microbiology department of a medical school and in the laboratory of a large hospital. Vacancy to be filled before the beginning of the next academic year. The starting salary depends on background and experience, but for a qualified person would range about $7000 per year. Teaching obligations are moderate, time for research work with satisfactory opportunities and equipment. Address: V-46.

• PSYCHIATRIST: Opening for full-time employment in VA hospital. Acute intensive treatment service affiliated with Baylor University College of Medicine and Texas Medical Center. Teaching of residents as well as care of patients is required. University appointment commensurate with qualifications. Superior opportunities to do laboratory as well as clinical research. If certified, depending on qualifications, pay may be as high as $13,760. Also, excellent opportunities for experience years after residency to prepare for certification. Write Manager, VA Hospital, Houston, Texas.

• PSYCHIATRIST: Full time for school of medicine, active teaching and treatment program. Salary open. Address: V-47.

• ASSISTANT PROFESSOR OF PHARMACOLOGY: Ph.D. or M.D., latter preferred. Teaching, administration and research. Salary $4,500-$6,000 depending upon qualifications and experience. Address: Dr. M. F. Murnaghan, Department of Pharmacology, University of Ottawa, Ottawa, Ontario.

• PREVENTIVE MEDICINE: Administrative-teaching position teaching public health to medical students; coordinating preventive medical services and medical supervision of an outpatient service. Address: Dean F. G. Gillick, Creighton University School of Medicine, Omaha 2, Nebraska.

• ANATOMIST: Instructor or assistant professor with M.D. or Ph.D degree. Half time teaching, half time research. Well equipped laboratories and excellent library. Opening July 1, 1956. Prefer young man with broad training. Address: Dr. S. I. Kornhauser, Chairman, Dept. of Anatomy, University of Louisville, School of Medicine, 101 W. Chestnut St., Louisville 2, Ky.

• PH.D.'s: In the general field of microbiology, immunology, virulogy, bacteriology and pathology. To assist in virus research for manufacturer of veterinary biologics, vaccines and serums. Principal activity toward new product development, experimental and clinical studies of products, product improvement and techniques and standards of production. Address: V-48.

• BACTERIOLOGIST: Assistant professor and assistant bacteriologist, Provincial Laboratory (combined appointments). M.D. with some experience of hospital or public health bacteriology. Initial salary $6,250 plus cost of living bonus, approximately $300. Promotion to associate professor on satisfactory service. Apply to the dean, faculty of medicine, University of Alberta, Edmonton, Alberta, Canada.

• ANESTHETIST: For two or three year appointment at the American University Hospital in Beirut, Lebanon, beginning in summer or fall of 1956. Academic rank of assistant, associate or full professor depending upon experience. Apply by air mail to: Dr. Joseph J. McDonald, Dean, American University of Beirut, School of Medicine, Beirut, Lebanon.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 185 N. Wabash Ave., Chicago 1, Ill., not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

• INTERNIST: Well-trained, qualified use of radioisotopes. Available September 1956. Desires clinical faculty position on salaried basis, either full-time or part-time with private practice privilege. Military service completed. Age 30; married, with family. Address A-210.

• ANATOMIST: Man; D.D.S., 30. Veteran. Experienced in teaching gross anatomy, histology, embryology, neuro anatomy, some pharmacology, in approved medical school. Have completed 3 years of medicine in approved medical school. Desire teaching position with opportunity to complete work for M.D. in return for tuition and stipend. Prefer U.S. or Canadian school but would consider foreign locality. Available immediately. Address: A-213.

• BIOCHEMIST: Ph.D., 34, married. Experience in microbial growth factors, isolation of bacterial toxins and animal nutrition. Presently research associate in medical school studying relationship of nutrition to antibody formation. Desire teaching and research in medical school or membership in hospital research team. Address: A-214.

• PHYSIOLOGIST-PHARMACOLOGIST: Ph.D. 1953, 37, male, family. Majored in physiology while worked toward Ph.D. degree, taught physiology and pharmacology the last two years as assistant professor. Desire teaching and research or teaching position either in physiology or pharmacology. Available July 1956. Publications. References. Address: A-215.

• PHARMACOLOGIST: 33, veteran, Ph.D., with one year post-graduate research stressing localization of site of action of drugs on the central nervous system with well known pharmaceutical company. Desires research preferably in neuropharmacology with or without teaching. Publications. Address A-216.

• ANATOMIST: Ph.D. Woman. Seeks academic position. Address: A-217.

• ZOOLOGIST-CYTOLOGIST: Ph.D. June 1956. Male, married, no children. Interested in problems of growth and differentiation on the cellular level as studied by cytochemical and classical cytological methods. Experience in cytochemical methods for chromosomes, nucleic acids and basic nucleo-proteins. Desires either an academic post with facilities for research or a straight research position. Address: A-218.

• PATHOLOGIST: 33, board certified in pathologic anatomy and clinical pathology. M.D. Illinois, 1945. Experience in diagnostic pathology, experimental pathology, and teaching. Faculty appointment. Publications. Desires position combining hospital pathology with opportunity for teaching and research. Address: G. A. Nedzel, 45 E. Bellevue Place, Chicago 11, Illinois.

• INTERNIST: Hematology, radiobiology subspecialties. Passed Internal Medicine Board written examination. Four years radiation-hematology research. Director radioisotope laboratory. Desires academic-type research position with opportunity for clinical hematology teaching and practice. Available summer 1956. Address: A-219.

• BIOCHEMIST: Ph.D. 28. At present holds a postdoctoral research fellowship sponsored by the National Institute of health. Research concerned with alcohol metabolism. Fellowship expires June, 1956. Desires teaching position with research opportunities. Address: A-220.

• MICROBIOLOGIST: Ph.D., 32, married. Doctorate from large Eastern university Experience in planning and directing research program in medical microbiology; teaching experience. Presently Research Associate. Desires staff position at medical or dental school with opportunity for research. Address: A-221.

• PARASITOLOGIST: Ph.D., male, unmarried. Has Ph.D. in parasitology from University of California, Berkeley, California. Two and a half years of experience in teaching and research in parasitology. Currently engaged in a study of the epidemiology of certain parasites of animals and man; engaged in summer in studies of fauna in Arctic areas. Desires teaching position. Have prepared lecture notes in medical and veterinary entomology, helminthology and protozoology and medical bacteriology. Address: A-222.

• INTERNIST: 34, Australian, M.D., M.Sc., seeks university clinical research teaching post with view to permanent residence in U.S.A. Excellent training in basic sciences (pathology, bacteriology) and internal medicine in Australia, England, France, U.S.A. Publications, society membership, teaching experience. Main interest cardio-pulmonary disease. Would accept fellowship initially in cardio-pulmonary group. Address: A-223.

• DERMATOLOGIST: Diplomat of American Boards, candidate for Ph.D., with extra training in microbiology and histopathology, interested in clinical, research and teaching opportunities. Age 33; draft exempt. Department head preferred. Address: A-224.

• PARASITOLOGIST: M.S., Ph.D., certificate in tropical and military medicine. Retired army officer, 54, with 15 years experience in university teaching of undergraduates and graduates and 13 years varied experience in field, laboratory and teaching in army. Desires full or part time position in medical school. Special interest parasitology and tropical medicine. Scientific publications, books. References. Available in fall. Address: A-225.

• PARASITOLOGIST: Ph.D., June 1956. Experienced in teaching, laboratory and field research, desires teaching and/or research position in Parasitology, related fields or basic medical science. Available May, 1956. Eastern location preferred but others considered. Address: A-226.

• ANATOMIST: Ph.D., 32, family, desires teaching-research position in medical school. Research interests in endocrinology, radiobiology. Address: A-227.

• PHYSIOLOGIST, PARASITOLOGIST: Ph.D. University of Michigan. Twenty years experience teaching and research. Willing to teach nurses, medical technologists, etc. Desires full time academic appointment. Address: A-228.

• INTERNIST: 35, present medical school faculty member. Rounded clinical and teaching experience. Extensive original investigation, publications in metabolism and related fields. Radioisotope techniques. Board certified. Desires full-time teaching position with opportunity for investigative contribution. Address: A-229.

• ANESTHESIOLOGIST: Foreign graduate; female; trained in institution with medical school connection. Seeks position with teaching institution or similar. Address: A-230.

• PHARMACOLOGIST: Ph.D., 29, atomic research, publications, some teaching. Entering junior year of medical school. Desires part-time academic post to complete medical program. Address A-231.

• PHYSIOLOGIST-ZOOLOGIST: Ph.D., 34. Training and interest in endocrinology and cell physiology. Presently engaged as research associate in biochemistry. Desires academic and/or research position. Address: A-232.

• INTERNIST-CLINICAL CHEMIST: M.D., 40, male, family. Now head physiology, hospital medical research foundation; medical school appointments assistant professor clinical pathology. Presently engaged animal and clinical research and teaching (medicine, clinical pathology, pharmacology experience). Fulltime hospitals and/or medical schools 10 years, including 5 years head 400 bed hospital clinical chemistry section. Diplomat American Board Pathology; American Board Clinical Chemistry. Major interests: water and electrolytes, diabetes, carbohydrate metabolism and endocrinology. Address: A-233.

• ANATOMIST: M.D., Ph.D., married. At present associate professor but desires change of locale. Teaching experience in microscopic anatomy; research in cyto-chemistry. Publications. Desires teaching-research or full time research position in medical center in upper midwest or west. Adress: A-234.

• BIOCHEMIST: Ph.D. Now assistant professor of biochemistry at medical school. Fifteen years' teaching experience, over 40 publications in the field of enzymes, proteins, lipids and biochemistry of cancer. Seeks position in institution with good research facilities and appropriate remuneration. Excellent references supplied on request. No regional preferences. Address: A-235.

• INTERNIST-PHYSIOLOGIST: 34. Interests in cardiovascular research and teaching. Experienced in cardiac catheterization. Presently full time faculty appointment. Desires academic situation offering future and opportunities in field of stated interest. Address: A-236.

• MICROBIOLOGIST: Ph.D., 31, married. Five years teaching experience in general and medical bacteriology, immunology, mycology, and virology. Total of six years experience in virus and cancer research. Presently engaged in full-time virus research. Desires faculty appointment (asst. prof.) with teaching and research opportunities. Address: A-237.

Publications

Useful information for both medical educators and students is published by the Association of American Medical Colleges. These publications may be obtained either free of charge or at cost from the Association headquarters office, 185 N. Wabash Ave., Chicago 1, Ill.

Booklets

Medical Education Today ($1.50).
Report of the Conference on Preventive Medicine in Medical Schools (clothbound, $1.50).
Admission Requirements of American Medical Colleges—1956 ($2.00).
Fellowships, Funds and Prizes Available for Graduate Medical Work in the United States and Canada—4th Edition published 1954. ($1.50).
By-Laws of the Association of American Medical Colleges (Revised 1955).
Minutes of Proceedings of the Annual Meetings (1947-1955 Minutes now available).
Public Understanding and Support of Medical Education.

Journal of Medical Education

Journal Supplements available:
The National Health Service of Great Britain ($1.00).
Medical Education in Time of National Emergency ($1.00).
The Critical Cataloging of Medical Films ($1.00).
The Teaching of Physiology, Biochemistry and Pharmacology (Report of the 1953 Teaching Institute)—$2.00, paperbound; $3.00, clothbound.
The Teaching of Pathology, Microbiology, Immunology, and Genetics (Report of the 1954 Teaching Institute)—$2.00, paperbound; $3.00 clothbound.

Medical Audio-Visual Institute Publications

Film Catalog, Fall 1955
Reprints from the Audiovisual News Section of the Journal of MEDICAL EDUCATION.
Films in Psychiatry, Psychology and Mental Health (available from the Health Education Council, 10 Downing St., New York 14, $6.00).
Films in the Cardiovascular Diseases (Part I available from the American Heart Association, 44 E. 23rd St., New York 10, $2.00. Part II available from the Medical A-V Institute, $2.00).
Review of Films in Atomic Medicine.
The Short Motion Picture for Medical Classroom Instruction.
Films published by the MAVI are included in the Film Catalog.

Publications of Related Organizations

Suggestions for Supplementing the Medical Curriculum in Time of National Emergency (Joint Committee on Medical Education).
Hospitals Participating in the Matching Program 1956 (NIMP publication).
Results of the Matching Program 1956 (NIMP publication).
The Student and the Matching Program 1956 (NIMP publication).
Medical College Admission Test—Bulletin of Information 1956 (Educational Testing Service publication).